Message Information

Date	04/12/2012 03:20 PM
From	**OSEI CORP <oseicorp@msn.com>**
To	Steve Mason/R6/USEPA/US@EPA; LisaP Jackson/DC/USEPA/US@EPA; Philip Campagna/ERT/R2/USEPA/US@EPA; Ragan Broyles/R6/USEPA/US@EPA; Steve Mason/R6/USEPA/US@EPA; Craig Carroll/R6/USEPA/US@EPA
cc	
Subject	FW: Gulf of Mexico spill

Message Body

Dear Steve Mason Ragan Broyles, Jim Staves, and Lisa Jackson,

The OSEI Corporation is requesting yet another approval for the use of OSE II. The Shell oil company, has been denoted as the company responsible for a spill in the Gulf of Mexico today in reports, therefore we are formally requesting approval for the use of OSE II to safely and effectively remediate Shell oil company spill in the Gulf of Mexico. This is an emergency therefore you quick response is required.
Steven Pedigo
Chairman/CEO OSEI Corporation

From: oseicorp@msn.com
To: shellcustomercare@shell.com
Subject: Gulf of Mexico spill
Date: Thu, 12 Apr 2012 14:11:46 -0500

Please direct this email to the head of environmental, or the head of Shell oil spill response.
Oil Spill Eater II is on the EPA's NCP list and can be used to clean up your spill problem in the Gulf of Mexico, without destroying natural resources, or adversely effecting the water column or sea bed. OSE II will help protect Shell's bottom line! We have enough OSE II to remediate approximately 1,000,000 gallons of oil in our Dallas, warehouse. OSE II is the cost effective way to meet your companies governance policies. You can contact me direct at 214 783 6992, see attachments especially economic comparison.
Steven Pedigo
PS if you will send me the direct email address to the head of environmental or spill response we will send the email direct.

OSE II – SAFE AND RELIABLE BIOREMEDIATION FOR OIL SPILLS

SCIENTIFIC TESTING, THIRD PARTY ENDORSEMENTS

Since 1989, OSEI Corporation has effectively cleaned up more than 16,000 spills as a first response method* for cleaning up oil spills. The product, ***Oil Spill Eater II*** ™ (OSEII) has been independently and rigorously

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tested in scientific settings the world over. It is distributed in over 35 Nations and is listed on the US EPA's National Contingency Plan for Oil Spills (NCP); OSE II is listed in the U.S. Defense Logistics supply chain and the Navy DENIX system as BAA Book 18 number 14.

Shoring up Mother Nature's own remedies, *Oil Spill Eater II* is the world's most environmentally safe and cost effective bioremediation process for the mitigation of hazardous waste, spills and contamination--virtually anywhere and of any size. It is environmentally safe because it uses natures own bioremediation processes to effectively eradicate hazardous materials.

*A First Response designated product means it can be used on fresh oil as an immediate clean up response method as opposed to being designed for use on weathered oil or chemicals.
OSE II can also be used on weathered spills.

THE PROCESS

When OSE II is applied to a spill:

- the biosurfactants attack the molecular structure of the Hydrocarbon, by breaking the spill into small particles, then the oil is solubilized which increases the oil/water interface--all in approximately 30 minutes.

- during this process the OSE II enzymes form protein binding sites act as catalysts to induce the enhanced bacteria to utilize the broken down hydrocarbon as a food source.

- once these reactions have taken place, several conditions become evident:

    a. the oil is broken up, adhesion properties are diminished (which causes oil to release from marsh grass, vessels, BIRDS, marine species, beaches and more)
    b. the fire hazard is reduced (which protects responders & ports)
    c. the oil is caused to float (which prevents secondary contaminated areas and water column oxygen depletion)

and most importantly

d. the oil is detoxified so it can be used as a food source at which point the oil is digested to an end point of CO2 and water;

e. And finally, the enhanced bacteria die off to pre spill background levels.

- While these reactions are occurring OSE II's nutrient system is rapidly colonizing indigenous bacteria (OSE II does not introduce non indigenous bacteria into any eco system).

- Once the indigenous bacteria run out of the OSE II nutrients the bacteria then utilize the only food source left, the detoxified oil.

- There are also constituents in OSE II that once mixed and activated by natural water cause OSE II constituents to molecularly adhere to hydrocarbons. Hence, no matter where the current or tidal action pushes the oil, OSE II will stay with it.

EFFICACY TESTS, SCIENTIFIC STUDIES

OSE II can be used on the surface, below the surface, on the ocean floor, in marshes, estuaries, sand or soil beaches on rocks, in bays, ports and harbors. Ample case studies are available to prove it's workability in all mediums. OSE II is virtually non□toxic and extremely effective in breaking down oil. We suggest you go to OSEI Corporation's Technical Library to view the following:
(to view documentation and actual test reports, click the blue links below)

Salt Water Efficacy Tests:

- U.S. EPA / NETAC 21 Day & 28 Day Bioremediation Test d Biodegraded Alaskan Crude 98% in 21/28 days. (pg 25-35)
- U.S. Respirosity Test – EPA determined OSE II to reduce hydrocarbons by 98% and aromatics by 85% which was better than any other product tested. (pg 41-44)
- University of Alaska (Dr. Brown) PAH Test – Demonstrates that OSE II with mineral nutrients and hydrocarbons is **300%** more effective than without OSE II. (pg 45-49)
- Mega Borg Ship Spill in Gulf (South African Crude Oil) Test – In 216 hours OSE II lowered TPH from 100,070 ppm to 516 ppm for a 99.5% reduction. (pg 50-52)

- BETX Bioremediation Test□ OSE II can even work well on Benzene, Ethyl Benzene, Toulene and Xylene ratios demonstrate the potential to biodegrade as much as 98%. (pg 53-56)

Fresh Water Efficacy Tests:

- Chevron Crude Oil Bioremediation Test□ OSEII on Chevron Crude in 24 days reduced 95,200 ppm to 690 ppm or 99.8% effective on biodegrading this oil.

Soil Efficacy Tests:

- U.S. Marine Corps Base 29 Palms California (Cleanup Won Environmental Award) (pg 1-5)

Salt Water Species Marine Toxicity Tests

- U.S. EPA / NETAC Mysid Toxicity Test (this test was run twice) – LC50 Test, at 96 hours OSE II greater than 2100 mg/L.

- Both Mummichog and Artemia Salina Toxicity Test – LC50 Test, at 48 hours OSE II is 5285 mg/L. (pg 14-23)

Fresh Water Species Marine Toxicity Tests:

- Rainbow Trout Toxicity Test by Environment Canada□Toxicity tests state 1000 mg/L or less is toxic. Anything higher is acceptable and considered non– toxic. OSE II, test result 10,000 mg/L = non□toxic.

Beneficial Environment Effects:

- Biological Oxygen Demand for OSE II –OSE II has minimal impact on BOD, less than 7%.
- Dispersant Swirling Flask Test □ Proves OSE II causes oil to float

PRODUCT DEMONSTRATIONS, STATE OFFICIALS

For a product overview from TV News and demonstrations see:

- WLOX News OSEI Corp and Oil Spill Eater II are

demonstrated for all the Senators and members of Mississippi DEQ. The product shows how quickly Oil Spill Eater II. Can work to begin breaking down an Oil Spill.

- After seeing this demonstration, Senator Tommy Gollott of Mississippi sent a formal request to the Coast Guard and EPA response team members requesting the use of OSE II.

- Department of Environmental Quality ALABAMA Demonstration:
  - DEQ Rep Contacted the Navy to verify they use OSE II
  - "This meets the criteria that the State of Alabama is looking for because it's not adding a 'superbug' it is a simple process, there is no magic" Alabama DEQ Rep.
  - After demo, Senator Hank Erwin sent formal request to use OSE II to EPA.

- Demonstration Video on DWH Oil on private property.

OTHER ENDORSEMENTS

- Mr. Nick Nichols of the EPA oil program, and Debra Dietrich of the EPA Headquarters and Mr. Robinson EPA, Region 9 all have first□hand knowledge of OSE II being used in San Diego Bay by the U.S. Navy for over 100 spills, over a 3 ½ year period with no adverse effects to the whales, dolphins and other ocean ecology. OSEI Corp and OSE II are trusted and used by all 5 bodies of the U.S. Military.

- The EPA/Regional Response Team 6 had a success with OSE II on the Osage Indian Reservation.

- BP has used OSE II in Trinidad and Tobago and a refinery in Greece.

- OSE II has been extensively reviewed by the Navy

Environmental Health Center in Norfolk, Virginia. Mr. Jerry Drewer was our Contact: (757) 363x 5540. OSE II has also been extensively tested by the Naval Research Lab in Key West, Florida: Our contact was Mr. Jan Berge (305) 293x 4216.

_OSEI Economic_Comparison-Final Final 4 7 2012

BP_Jack_Lynch_Thank_you_letter_9_16_2011_-Edit_1_SRP-1.docCoast Guard approval from BP spill.doc

epa Listing information letter OSEI, highlighted section vl.docC Coast Guard White paper edited.pdf

OSEI summary of BP Testing of OSE II for the Deep Horizon Macondo spill in the Gulf of New 20102011[1] -1.docx

OSEI_Summary_of_Department_ofInterior_testing_of_OSE_II_on_Dielectric_oil-1.doc

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A COMPREHENSIVE COMPARISON BETWEEN OSE II, MECHANICAL METHODS AND CHEMICAL DISPERSANTS IN LAYMEN'S TERMS

INTRODUCTION

Oil Spill Eater II is the name of a non-toxic product which provides the means for moving oil spill response out of its current 19th Century methodology into the realm of advanced technological 21st Century breakthroughs for swiftly addressing and remediating *100% of any spill in any environment.* **In comparison, current response methods employed by three major oil companies - BP, Exxon and Shell - are obsolete and obtain dismal results.**

Most recently, BP, Exxon, and Shell have utilized *mechanical clean up* on the Gulf of Mexico Deepwater Horizon (DWH) oil blowout, the Yellowstone River oil spill in Montana, and the recent oil spill in the North Sea, respectively. **Mechanical clean up in calm seas only has the capability of remediating somewhere between 2 and 8% of a spill; a woefully inadequate response.**

Also utilized in the Gulf of Mexico blowout was Exxon's outmoded invention *Corexit,* a chemical dispersant licensed to Nalco Holding Company for manufacturing and distribution. The label on this horrifically toxic dispersant clearly states it can cause kidney failure and death and the MSDS (Material Safety Data Sheet) specifically warns, "Do not contaminate surface water" with it. Additionally, toxicity testing in regards to marine species shows little tolerance by all forms of sea life; thus, applying it on spills as a preferred response method **increases the toxicity of the spilled oil on which it is used.** Despite this, millions of gallons of Corexit have been sprayed on and injected into the Gulf's wateres.

THE EPA'S Old Policy Of Dispersant use has been removed Due to the reason's below

The EPA (Environmental Protection Agency) requires that any dispersant product applying

for inclusion in the Code of Federal Regulations National Contingency Plan Product Schedule of approved products for oil spill cleanup, known as the NCP list, undergo a dispersant test before permitting their use on spills in US navigable waters. A dispersant product must demonstrate that it causes a minimum of 45% of the oil to sink within 30 minutes, despite the contrary indication to this as a standard because the NCP list states that it is illegal to sink spilled oil.

Hence, one of the US EPA's old illogical criteria for addressing a toxic spill is that it moves the oil into the secondary water column zone. This spreads the toxic contamination throughout the most vital area for marine life where at least 60% of marine species live. (The catastrophic results of this are being thoroughly documented in increasing numbers of science papers currently being released.) The purpose of cleaning up an oil spill is to remove the toxicity from the environment so that living organisms, even single-celled organisms, can survive. What is the logic, then, in adding Corexit, an even more toxic substance than the oil, to spread the contamination throughout the living environment of the majority of marine life species? **A spill's damaging impact should be limited, not purposefully expanded and moved into additional, secondary areas.**

After a period of time, dispersants then cause the oil to sink to the seabed, adversely effecting bottom dwellers and wiping out entire species. The sunken oil then causes additional problems such as the depletion of oxygen from the water because so much *carbon** has been loaded into the water column. Depletion of oxygen causes mass die offs (called fish kills) where enormous numbers of marine life are obliterated all at once from extreme lack of oxygen.

This, however, is not the end of the destructive onslaught of the chemical dispersant response. Next, the cleanup response to the DWH showed that, even when dispersants are applied up to 75 miles away from the shore, the oil can still, through underwater plumes, be delivered to the shorelines where even greater natural resource destruction then ensues in, yet, a third and unnecessary assault on natural resources by the same oil. The intertidal zone species - species that live in sand, rocks, and marsh habitats - become coated with oil and the life is suffocated out of these areas.

To be deemed effective by the US EPA, dispersants merely have to be capable of sinking oil, not cleaning it up. In fact, there is no "defined end point" (scientifically predictable end result) to the application of dispersants. Contrary to baseless media reports, a Woods Hole Oceanographic Institute study completed in March 2011 demonstrated that the oil is taking longer to degrade than expected and showed that it would have been better to do nothing, rather than spray/inject massive amounts of toxic Corexit on and into the Gulf waters. When one understands the natural processes by which Mother Nature cleans up an oil spill (how ever long it may take, left to her own devices) it becomes scientifically predictable as to why the application of Corexit has slowed down the oils natural degradation because the highly toxic dispersant kills and suppresses the naturally occurring microorganisms that would otherwise digest the oil and break it down into its non-toxic components. By destroying the natural microorganisms, it prolongs Mother Nature's clean up time, needlessly extending the toxic impact of the oil and dispersant on the eco system.

The EPA forced BP to stop using dispersants in US navigable waters during the Gulf of Mexico Macondo spill.

NEEDLESS HEALTH AND ECONOMIC CONSEQUENCES

An oil spill cleanup response that includes toxic dispersants only increases the number of areas negatively impacted and intensifies and escalates the adverse effects by the spilled oil. It causes large numbers of species to be wiped out of the water column, seabed, and intertidal zones. This, in turn, severely impacts commerce in the region associated with harvesting US navigable waters, and endangers tourism, and all geographically or economically associated industries.

As can easily be seen on the MSDS of both Corexits, they cause a wide variety of extremely serious physical ailments: severe respiratory problems; kidney and liver failure; internal hemorrhaging; skin lesions; sudden and severe dizziness and nausea; short-term memory loss; long-term, flu-like symptoms which do not resolve with standard flu treatment; severe eye damage; severe compromise of immune system; reproductive problems; and death.

The EPA has been negligent in the extreme to permit over 2 million gallons and more of this product to be sprayed and injected into the delicate eco system of the Gulf of Mexico.

Scientists tracking the Gulf of Mexico spill have proven that these dispersants have compromised thousands of responder's health, as well as the citizens that live and work on the Gulf Coast from Texas to Florida. This devastation was easily predicted when one simply reads Corexit's product labels.

PREDICTABLY DESTRUCTIVE BUT DOWNPLAYED "TRADE OFFS"

The EPA's website states that there are "tradeoffs" with the use of Corexit/dispersants, although they do not clearly define what these tradeoffs are. If the American public had more fully understood that these tradeoffs were enormous natural resource damages, death and compromised health for untold numbers of responders and Gulf residents, with no positive benefit on the other side of the tradeoff, it is unlikely that this method of response would have been tolerated.

Economically, where is the logic of using a cleanup method with "tradeoffs" that only exponentially increase the cost of a spill's cleanup response, especially when there is a non-toxic alternative, which has absolutely no tradeoffs?

There are currently fantastic costs mounting based on aggregating evidence that clearly shows the enormously exacerbated damages associated with this type of response. These unnecessary costs include, among others, litigation fees, damaged health, loss of life,

shattered livelihood, disastrous social and community impact, entire populations and generations of marine life species decimated, long-term devastation to the environment. Given these far-reaching losses, toxic chemical dispersants should be immediately eliminated as an oil spill response method.

A COST-EFFECTIVE, THOROUGH SOLUTION

Again, the reason it is important to clean up a spill is to reduce the toxicity to the environment and to reduce the time period over which living organisms are exposed to the toxic contamination so that they can survive. Toxic chemical dispersants destroy organisms, from the smallest microbes to the largest whales, and endanger wildlife and the public's health, as well. Mechanical methods are utterly inept, leaving in place the majority of the spill, which increases the length of time the environment and marine life are exposed to the toxicity.

All of the above destruction to natural resources, human health, and the economy can be completely avoided. There has been an extraordinary technological breakthrough in the field of oil spill cleanup. Completely non-toxic and safe, it does *exactly* what Mother Nature does to clean up a toxic site. The *only* difference is what would take Mother Nature decades or centuries to clean up takes only a few weeks to achieve the same result, with absolutely no negative side effects. It is the only product in its field that is a *first and only response method necessary* to achieve 100% cleanup of an oil spill. It is a fraction of the cost of other antiquated solutions such as chemical dispersant and mechanical means. It has a scientifically proven, defined end point that it achieves once applied: it turns the oil into water and CO2. It causes absolutely no negative side effects or tradeoffs. It has effectively cleaned up over 16,000 oil spills in the past 23 years. And it is already on the EPA's NCP list. It is called Oil Spill Eater II (OSE II).

Below are charts and bullet-points comparing OSE II to both mechanical means and dispersants in the following areas: effectiveness, toxicity levels, human health consequences, natural resource damage, cleanup costs, and the potential for creating expensive litigation and payouts.

COMPARISONS BETWEEN OSE II, MECHANICAL METHODS AND CHEMICAL DISPERSANTS

Clean Up Potential

OSE II	100% conversion to CO2 and water
Mechanical	A maximum of 2 to 8% of the oil is actually removed from the environment.

Dispersants/ Corexits 0% clean up. Their only predictable result is that they sink and spread toxic oil throughout delicate waters, causing destruction and the need for secondary clean up on shorelines (multiplying the clean up costs and damages)

Toxicity Factors

OSE II

A. OSE II, itself, is completely non-toxic. OSE II confines and limits toxicity of the oil to the original spill area: starts reducing toxicity immediately upon application; prevents toxicity to marine and wildlife, humans, seabed, shorelines, marshes and estuaries.
B. Toxicity tests on OSE II by US EPA and foreign governments show OSE II to be completely non toxic to fresh and salt water marine species.
C. One of the many official confirmations of this is that in 1989 OSHA wrote a letter stating there were no toxicological concerns with any of the OSE II ingredients that would pose a significant health risk to humans.

Mechanical The oil itself is toxic to the environment. Leaving 92% to 98% of the oil in the environment increases the toxicity to the water column, seabed, shoreline, marshes and estuaries, adversely effecting marine species, wildlife and humans, as well as all associated flora and fauna.

Dispersants/ Corexits

A. Increases the toxicity of the oil. Causes a variety of serious physical ailments and death to responders and citizens who are exposed to the vapors, water, and oil where it has been applied, through inhalation or direct contact. Kills marine and wildlife species, destroys plants and all associated flora and fauna. Spreads the dispersants' and the oil's toxicity throughout the water column, eventually sinking it to the seabed, much of which then moves into the intertidal zones.
B. EPA toxicity tests show both Corexit products to be very toxic to marine species, and show they increase the toxicity of oil to the marine environment.
C. The product's label states that Corexit causes kidney failure and death and the MSDS of it's most toxic component, 2 butoxy ethanol (which comprises, by volume, 60% of Corexit) details dire human health consequences when exposed to it. It has been shown that the use of Corexit on the Valdez spill compromised and shortened the lives of thousands of responders.

Human Health Consequences

OSE II	Can be handled without any adverse health consequences as proven during the Megaborg spill when, to prove just how non-toxic it is, a small amount of OSE II was ingested on Houston TV, Channel 11 News. OSE II reduces to just a few days the time frame during which a spill will have toxicological effects on humans, marine, wildlife, flora and fauna. OSE II's official Material Safety Data Sheet shows it to be completely safe for human contact, and for the environment as well as a letter from OSHA (the US Occupational, Safety, Health administration) stating OSE II would have no effect on Personnel.
Mechanical	Allows 92% to 98% of a spill to spread and linger for years, exposing humans that work and play in water settings and intertidal zones, to be continually exposed to the toxicity of the oil.
Dispersants/ Corexits	Dispersants cause parts of the oil to gas off, putting the oil and distillates and 2 butoxy ethanol (the most toxic chemical in Corexit and which comprises 60% of the volume of Corexit) into the atmosphere, compromising human health and vegetation inland upon which it falls through rain and evaporation/condensation. Dispersants attach to oil and sink the oil into the water column where humans swim, dive, snorkel, or stand in the water, or come in contact with it from spray from waves on beaches or shorelines. Direct contact by accidental spraying when atomized dispersant drifts onto responders compromises health. Exposure causes severe respiratory problems; kidney and liver failure; internal hemorrhaging; skin lesions; sudden and severe dizziness and nausea; short-term memory loss; long-term, flu-like symptoms which do not resolve with standard flu treatment; severe eye damage; severe compromise of immune system; reproductive problems; and death.

Natural Resource Damage

OSE II	Prevents natural resource damage by preventing the oil from contaminating secondary areas. It does this by eliminating the oil's adhesive properties so that it will not stick to anything, including marine species, wildlife, sandy beach, rocks, marsh grass or other vegetation, sediment, humans, as well as boats, booms, nets, etc. All are then protected from the toxicity of the oil.
Mechanical	Allows 92% to 98% of the sticky oil to destroy natural resources and allows the lingering toxicity of the oil to spread widely throughout the eco systems and environment.
Dispersants/ Corexits	Increases the oil's adverse impact on natural resources, and the highly toxic dispersant adds to the destruction, spreading the spill to the water column, sea floor, shorelines and intertidal zones, adversely

effecting all of these additional areas, and adding unnecessary costs to a spill event.

Litigation

OSE II

Prevents litigation by causing oil to float up out of the water column and seabed (while still making the oil very difficult to see). This also allows marine species to escape the spill by swimming under and away from it. Because OSE II eliminates the oil's adhesion properties, it cannot adversely affect intertidal zone flora and fauna, and this prevents loss of jobs in the areas of tourism and seafood harvesting and marketing, which protects the spill area's economy. Human health is protected. All these litigation points are eliminated or reduced dramatically.

Mechanical

Creates massive potential for litigation since 92 to 98 percent of the spill is allowed to affect the water column, seabed, flora, fauna, intertidal zones, and humans associated with the shorelines. Adversely effects the economics of tourism, harvesting and marketing seafood, and compromises human heath. All these areas, and more, are potential litigation points that occur from oil spill events.

Dispersants/ Corexit

Exponentially increases the potential for litigation since they unnecessarily exacerbate and spread the oil's impact to endless secondary areas, killing marine species, sinking oil eventually to the seabed, killing bottom dwellers, coral and other flora and fauna, which, in turn, adversely effects the harvesting of sea food, kelp and other flora. Allows oil combined with the more toxic dispersant to contaminate intertidal zones, shorelines, flora and fauna, adversely effecting human health, as well as tourism.
If for no other reason, the cost of litigation due to the use of dispersants should put them into the category of a completely unviable option for decision makers involved with a spill event.

The use of mechanical methods and or dispersants has proven in the Gulf of Mexico on the BP Deepwater Horizon spill to increase the spill's damaging impact on natural resources, cause the death of millions of marine and wildlife, heavily damage the economy in the northern Gulf shore States, and compromise the health of the responders and the public who live along the Gulf. It has heavily impacted the seafood, tourism and recreational industries throughout the entire Gulf. BP has needlessly spent billions of dollars on cleanup methods that are ineffective, and which, in turn, only increase resource damage and cause cleanup costs to spiral even higher by having to address the same oil when it comes ashore a second time. It has lead to the filing of thousands of lawsuits against BP.

COST COMPARISON

Comparing costs of oil spill cleanup between OSE II, mechanical methods and dispersants/Corexit, it is easy to see which spill response tool is far superior to any other oil spill cleanup method. As of April 2011, BP reported to their stockholders that it has spent between $26 - $28 billion on the DWH spill. In early September, 2011, that number was updated to 42 billion dollars. This necessitated the suspension of stock dividends in having to set aside $41 billion for potential predicted costs for the spill at that time. The OSEI Corporation does not know exactly how much BP has actually spent on this spill and the breakdown of those costs; however, BP has reported spilling 200 million gallons of oil between April 20th and July 23rd, 2010, so for comparison purposes we will use this figure, with the understanding that these figures are somewhat hypothetical. Nonetheless, the point below is clear, despite the fact that the amount of actual oil spilled and/or monies paid out by BP may not be accurate.

Per BP's reports, $42 billion had been spent as of April 2011 for 200 million gallons of oil. When one divides $42 billion by 200 million gallons, it comes to a cleanup cost of $210 per gallon of oil spilled using a combination of Corexit dispersants and mechanical clean up methods. This does not include any of the current or future litigation costs, litigation pay out, or natural resource damage costs, which will be in the hundreds of millions to billions of dollars.

The OSEI Corporation has determined, through contractors, that the cost to apply OSE II is approximately $2 per gallon of oil spilled in the Gulf. (The OSE II cost per gallon of oil cleaned up would be slightly more in other countries.) When you take into account deployment costs, our calculations show that for each gallon spilled it would require $4 to convert 100% of the spilled oil to CO2 and water, depending on how fast OSE II is applied. 200 million gallons times $4 equals $800 million. This means that, had BP used OSE II as its first and only response tool, it would have saved BP $41.8 billion on the Deepwater Horizon spill.

The low cost of application is due to the fact that the spill is very large, whereas with smaller spills the initial response causes the cleanup price per gallon of oil spilled to be higher. Despite this, in 2000 the US Navy performed a cost analysis between their use of OSE II, and their earlier, inadequate oil cleanup responses with mechanical equipment. They found that, with the mechanical methods, they were paying around $92 to $96 to clean up each gallon spilled. When they switched to OSE II, the Navy documented that they had cut their cleanup costs down to $12 per gallon of oil spilled, effectively reducing their clean up costs by 87% for each gallon spilled. This, while successfully addressing 100% of each spill, compared to the earlier methods they had used which only addressed about 5% of the spill, allowing the rest of the spill to adversely effect the environment.

If BP achieved an 87% reduction of their costs for the DWH blowout this would mean reducing their current costs down from $210.00 per gallon spilled to $27.30 per gallon

spilled. Using OSE II would have saved BP $36.5 billion dollars, while dramatically reducing potential litigation costs and payouts.

ANOTHER EXAMPLE OF WASTED FUNDS AND LOST PROFITS FOR AN OIL COMPANY

Exxon's pipeline break under the Yellowstone River in the summer of 2011 released at least 42,000 gallons of oil into the environment. Exxon responded originally with 345 laborers with chemical suits, gloves, and absorbents that looked like paper towels. In a few of the affected areas, Exxon trapped some of the oil on the river and tried to skim it, reclaiming, at most, about 5% of the oil and collecting a lot of contaminated water. This, then requires it's own secondary clean up procedures, adding even more unnecessary cost to the cleanup. The contaminated absorbents then had to be collected, taped up with duct tape, and piled up for their secondary clean up process, as well.

The spill initially contaminated approximately 20 miles of shoreline, predictably upsetting Montana residents and stakeholders. **Because Exxon continued the inadequate response with absorbents and mechanical clean up, the spill then contaminated over 240 miles of shoreline.** The natural resource damage fees will be exponentially more than they ever should have been. And only a small fraction of the oil will ever be cleaned up in this way, leaving behind a contaminated mess, lowered property values, health risks to the public and wildlife, and an even lower level of public confidence that the oil companies can responsibly handle any of their inevitable accidents. In early September 2011 it was reported Exxon will spend 42 million dollars for this very small spill!

Compare this to what would have occurred had OSE II been utilized instead. The clean up cost with so much labor and equipment could have been reduced to a couple of water trucks on the shoreline driving to the areas they could reach by road and simply deploying OSE II from the shore. The spill itself would have required four water vessels with OSE II staged on them with simple ejection systems to apply OSE II. Two of the vessels could have been set up just past the spill migration point, addressing oil as it moved down the river preventing the oil from migrating past their staged area. Two more vessels could have started at the source of the spill and moved down the river applying OSE II on each shoreline and in the water, until these vessels reached the staged vessels preventing further migration.

The four vessels and two water trucks would have required a total of 24 employees, and could have addressed the entire spill in a matter of days, reducing damages, contaminated shoreline, labor costs, and preventing any secondary clean up problems. There will inevitably be litigation and fines, most of which could have been limited or prevented. The estimated cost with the OSE II response is between $800,000.00 and $1.2 million, a huge difference in cost, just by changing to a more effective, non-toxic response, OSE II.

SUMMARY

There is a clear choice when it comes to oil spill response. On one side you have the antiquated, inadequate response methods with toxic dispersants and mechanical means. To their discredit, dispersants clean up 0% of the oil but, instead, merely sink it, increasing damages and adverse impacts, and extending and exacerbating secondary clean up problems. Similarly ineffective are mechanical means. At the very best, they clean up 2% to 8% of the oil, allowing 92% to 98% of the spill to adversely impact the environment. Both responses cause extensive natural resource damage, compromised public health, death of marine and wildlife, destruction of flora and fauna, adverse impacts on the economy of the area, and prompt expensive fines. All of the above provides endless opportunities for extremely costly litigation. Both dispersants and mechanical clean up methods are extremely expensive and are fundamentally ineffective if the purpose is to actually clean up the oil. In fact, with regard to toxic dispersants, it would be far better to do nothing at all, rather than create further destruction through their use.

On the other side is a cutting-edge, non-toxic, first response technology which provides a highly economical means to effectively addressing spills and limiting clean up costs, preventing and/or dramatically limiting damages to natural resources, marine and wildlife, the economy, and the public's health, and thereby averting and/or markedly lessening the potential for litigation. With dozens of official scientific studies and reports validating its safety and effectiveness, and the empirical results of over 16,000 effective oil spill cleanups since 1989 with no adverse side effects reported of any kind, OSE II is the clear choice for oil spill cleanup.

LOWERED PUBLIC RESISTANCE TO DRILLING

The successful use of OSE II would allow the responsible party of a spill to not only improve its public relations with the public and governments, but it would engender heightened confidence that, when the inevitable, occasional spill occurs, it can be efficiently and thoroughly cleaned up leaving little damage and ill will in its wake. The public perception of oil spill response today, and rightly so, is that a spill is going to create long-term devastation to the area in which it occurs. Repeated examples of the devastation resulting from the use of antiquated response methods - dispersants and mechanical means – have shaped the public's opinion.

OSE II would allow the responsible parties of an oil spill to 1) meet their fiduciary obligations to their stockholders, 2) comply with their governance policies, 3) protect the natural resources, and the public's health, safety, and welfare in those areas in which they are operating, and 4) quickly return a spill area to pre spill conditions while reducing

cleanup costs. OSE II is the clear economic choice when it comes to oil spill response; the numbers prove it.

Steven Pedigo
Chairman/CEO OSEI Corporation

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Dallas, Texas 75251
Ph: (972) 669-3390
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Mr. Jack Lynch, Esq.
U.S. General Counsel
BP America, Inc.
501 Westlake Park Blvd.
Houston, TX 77079

September 16th, 2011

Dear Jack,

I appreciate your taking the time, with Steve Palmer and Bob Stout, to meet with Barbara Wiseman of The Earth Organization and me by phone today to discuss the possible use of OSE II by BP in the Deepwater Horizon oil blowout. The information you have given us in both our earlier meeting that included Tom Milch of Arnold and Porter, and today's will be a great help in our continued efforts, through the Gulf States and the US Congress, to achieve a reversal of the EPA/RRT's decision to not utilize bioremediation/OSE II for this oil blowout.

When Barbara asked if you had heard back from your science group yet regarding their review of the documents you earlier requested we send them, I was pleased to hear that there had been several meetings/discussions about OSE II at BP and with your scientists, and that our information was "acceptable and the documents were fine."

Your statement that what BP is bumping up against, and what is preventing BP from further pursuing the implementation of OSE II is the government's decision on June 3, 2010 to deny the use of bio remediation/OSE II on this particular event. Your statement reiterated what the email from Mike Brien (BP's General Manager of Federal and International Affairs) stated on June 3, 2011 in which he informed me that BP was requesting OSE II to the RRT. At that time, in contradiction to the fundamental purpose of the EPA/RRT, BP was denied the use of OSE II to protect the U.S.'s natural resources. I do have to say that I was surprised by your statement that with the EPA's/RRT's decision in place, that "BP is bound by it, and beyond that, I'm not sure what there is to say."

This is a remarkable statement, as it delineates a set of circumstances that are not in BP's favor. BP made a request to switch to a more effective, non toxic alternative that was denied by the EPA/RRT, leaving BP in the position of being forced to suffer the burden of

paying for all the adverse impacts from the wholly inadequate cleanup response with mechanical, and dispersant methods. If my company was faced with having to pay billions in clean up costs, natural resource damages, economic distress payment's and litigation, I would have fought this decision with all I had, even to the point of filing suit against them to make them culpable for only allowing you to carry out failed responses that are adversely affecting BP's bottom line. It seems that BP could demand the right to protect themselves and their shareholders.

Although I asked the question in our call, Stephen Palmer's reiteration that you are bound by the government's decision did not clarify exactly *why* BP is not more forcefully pursuing a reversal of the government's decision to deny it the use of a non-toxic and remarkably more effective cleanup method. It is interesting to note that Governor Jindal had a fast track team headed by Dean Mallory of Lafayette University with PHD's from LSU, Tulane University, LA DEQ members, and others who deemed that OSE II had merit to be used on the BP DWH. This review then prompted Governor Jindal to ask for a demonstration on the Chandelier Islands on May 6th, 2010. We were, literally, on the tarmac about to get on the helicopter that Governor Jindal had sent for us to take us out to the demonstration site when the EPA/RRT VI stopped us with threats of future negative consequences to my company if we proceeded, but with no actual reasons given as to why. The Governor represented the State of Louisiana, an obvious stakeholder in the disaster.

Then BP, as the responsible party, followed up less than a month later with its own request for the use of OSE II, and EPA/RRT VI denied the use of OSE II again. This, again, begs the question "Why?", since 1) the EPA themselves had already used OSE II successfully on a major water spill, 2) the EPA knew, first hand, of the 100's of successful clean ups performed by the US Navy in San Diego Bay, with no adverse side effects, and 3) BP has used OSE II successfully on at least 3 occasions that we know of.

The fact that you gave them information and requested OSE II, along with their subsequent denial, should allow BP to file suit against them, making them culpable for forcing BP to endure the adverse financial and public relations resulting from the inadequate cleanup response and the subsequent devastation to the economy of the Gulf Coast, all of which could have been prevented with the use of OSE II. The EPA's actions are, at the very least, violating their own charter, which states they are to protect the natural resources of the Untied States of America, and the health, safety and welfare of the people. How could there not be some recourse in all of this for BP to be able to switch to an effective, non-toxic cleanup response method?

In case you are not already aware of this, there were three states' senators - from Louisiana, Mississippi, and Alabama - as well as the City Council of Destin, Florida who all saw effective demonstrations of OSE II, and then made formal requests for its immediate use on the Deepwater Horizon oil. The EPA/RRT just ignored these stakeholders as though they were of no importance; so their actions against BP should not be a complete surprise.

When I stated in our call that they should not be allowed to hamstring any responsible party to a response that is not in your best interests and that if they are forcing you to do something that violates their own rules, then they can't hold you responsible for the after

effects of using that response, I must admit that I find it hard to believe that BP would allow the EPA/RRT to put them in this position and that, as you reiterated several times, you feel "bound by it."

I assume that you know the history of Corexit and that the EPA/RRT have not only shown bias towards one product (Corexit 9527 until BP switched to Corexit 9500 in this spill), but have given one company a monopoly in the field of oil spill cleanup on U.S. navigable waters for the past 21 years, despite the fact that the product has never proven to clean up anything at all, and that it only exacerbates the problems of a spill. This reality has certainly been repeated and underscored in BP's DWH oil blowout.

As I mentioned in our call, my corporation has made a formal request for pre-approval or the necessary permits and or authorization for OSE II for the Gulf States and/or BP to be able to utilize it to protect the natural resources of the Gulf. The EPA RRT VI representative, Mr. Reagan Boyles from the Association for Prevention Response Branch Region VI, just sent me a rather incoherent letter in response, quoting regulations he has apparently not read because they very precisely show that the EPA/RRT is not following their own regulations. I am in the process of addressing his letter and with that, combined with some other actions we are taking, I believe approval for the use of OSE II is eminent.

I was pleased when you stated that if we "handle the government on this and get them to change their decision, we're happy to look at this further."

As I stated, we will continue to follow this pathway because I believe that the federal government is going to acquiesce on this stance because they have proven that the combination of dispersants and mechanical cleanup has allowed enormous natural resource damage that could have been prevented and the spill in the gulf is just one more demonstration of this. As I said, we will continue to defend BP's position for them: that you tried to switch to a non-toxic more effective response - we have written documents to prove this - and you weren't allowed to. We'll continue to discuss this with Congress and others, as well.

There is one thing I want to clear up from our conversation. When Barbara asked you to clarify the point that if we do handle the government on this, would BP then be willing to move forward and implement OSE II, you stated that if the government changes its mind and decides that bioremediation is workable at this time BP "would evaluate what is available." The point I want to make clear is that the OSEI Corporation is not requesting the use of bioremediation; we are requesting the authorization of OSE II for the BP DWH blowout and the pre approval of OSE II.

The OSEI Corporation's request for pre approval and authorization was just supported greatly by the U.S. Department of Interior BOEMRE's testing of OSE II for Nantucket sound. This recent study, performed by BOEMRE and the RRT natural resource trustee demonstrated and proved three key points: 1) while mechanical means could skim oil, it never gets more than somewhere between 2 to 8%, leaving behind 92 to 98% of the oil to adversely impact the environment; 2) dispersants are effective at sinking oil until the water temperature cools, at which time they are not as effective at sinking oil; however,

the end point of dispersant use is having to address the same oil twice after it has sunk and then comes ashore; 3) OSE II is the best response, which will now allow them to authorize and pre-approve OSE II with the RRT. We also believe this will help get OSE II plugged into the spill response plans for the oil rigs that BOEMRE permits.

It is extremely important, in the field of oil spill cleanup, to understand that there is only one first response bioremediation product that has been successfully developed that does not introduce non-indigenous bacteria into the environment, and that product is OSE II. There is only one product the EPA has peer reviewed and tested that has shown to be effective in an estuarine environment, and once again that is OSE II. So, when we get the government's authorization and/or pre approval status, the only product that will be available to BP will be OSE II, which, again, BP has already requested for use or demonstration of twice to the EPA/RRT VI.

I made a point towards the end of our discussion that OSE II is already approved in numerous other countries. Some have pre-approved it; others approve it whenever it is needed. It is not mere conjecture that OSE II can save BP millions, if not billions of dollars in your refineries on incidental spills, blowouts and pipeline breaks. In other countries where there is, apparently, more government interest in actually cleaning up the environment after a spill, we are saving millions of dollars in cleanup costs and potential future litigation costs for the responsible parties. So, even if the EPA will not allow OSE II on U.S. navigable waters for now, BP is not restricted from its use in most other countries.

It was encouraging to hear your response that you were "delighted to hear this as it opens up the possibility that bioremediation could be used when needed" and that "Anything that saves us money we should pursue." I want to follow up on your suggestion to keep in touch with folks at BP. I would appreciate it if you could let me know who in BP and which departments I should relay the information to that OSE II could help mitigate spills more effectively, while saving BP very significant amounts of money. I will also advise BP personnel in other countries with whom I have already had discussions of your advice.

Jack, as I stated, we will keep you informed of our progress with the EPA/RRT VI, and any progress with the states. Once again, we appreciate the chance to discuss these vital issues with you and your associates. We look forward to helping BP in other countries, and, hopefully, in the future, here in the U.S.

Sincerely,

Steven Pedigo

Chairman/CEO OSEI Corporation

U. S. Department
of Homeland Security

**United States
Coast Guard**

Commanding Officer
U. S. Coast Guard
Research and Development Center

1 Chelsea Street
New London, CT 06320
Staff Symbol: Contracting Office
Phone: (860) 271-2807

July 10, 2010

OSEI Corporation
P.O. Box 515429
Dallas, TX 75251

Attn: Steven Pedigo, President/Owner

DEEPWATER HORIZON RESPONSE BAA HSCG32-10-R-R00019, TRACKING #2003954

We are pleased to inform you that the initial screening of your White Paper submitted under Broad Agency Announcement (BAA) HSCG32-10-R-R00019 has been completed. It has been determined that your White Paper submission has a potential for benefit to the spill response effort.

Your White Paper has been forwarded to the Deepwater Horizon Response Federal On-Scene Coordinator (FOSC) for further action under its authority. Subject to the constraints and needs of the ongoing oil spill response, you may be contacted by the FOSC or the responsible party.

As identified in the BAA, there is no guarantee of a contract award.

We appreciate your interest in supporting the Deepwater Horizon Response effort.

Contracting Officer /s/
USCG R&D Center

OIL SPILL EATER II

TECHNICAL PRODUCT BULLETIN #B-53
USEPA, OFFICE OF EMERGENCY MANAGEMENT
REGULATION AND POLICY DEVELOPMENT DIVISION
ORIGINAL LISTING DATE: AUGUST 26, 1996
REMOVAL DATE: AUGUST 16, 2005
RELISTING DATE: SEPTEMBER 18, 2009
"OIL SPILL EATER II (OSE II)"

I. NAME, BRAND, OR TRADEMARK
OIL SPILL EATER II (OSE II) Type of Product: Bioremediation Agent (Biological Enzyme Additive [previously listed as a Nutrient Additive])

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
OSEI Corporation (Formerly Sky Blue Chems) P.O. Box 515429 Dallas, TX 75251-5429 Phone: (972) 669-3390

E-mail: oseicorp@msn.com
Web Site: www.osei.us
(Mr. Steven Pedigo, Chairman, CEO, Inventor)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

OSEI Corporation (Formerly Sky Blue Chems)
P.O. Box 515429
Dallas, TX 75251-5429
Phone: (972) 669-3390
E-mail: oseicorp@msn.com
Web Site: www.osei.us
(Mr. Steven Pedigo, Chairman, CEO, Inventor)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION°

1. Flammability: Water-based, non-flammable
2. Ventilation: Needs no ventilation; aqueous-based product; does not emit hazardous vapors
3. Skin and eye contact; protective clothing; treatment in case of contact: OSE II is not a primary dermal irritant. Avoid eye contact, and wear goggles if possible for the spray to come in direct contact with eyes. Facilities for quick and copious eye flushing should be provided and prompt medical attention should be sought if exposure and irritation persists. Protective rubber gloves are suggested during handling. Before mixing the product has a smell of fermentation. The product does not give off any harmful vapors.
4.a. Maximum storage temperature: 120°F
4.b. Minimum storage temperature: None; OSE II can freeze and thaw without adverse effects
4.c. Optimum storage temperature range: 72°F
4.d. Temperatures of phase separations and chemical changes: 120°F

V. SHELF LIFE

OSE II has a recommended shelf life of 5 years. After 5 years at optimum storage temperature, there is an approximate 10% decrease per year in product capability.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method:
A. Use surface spray apparatus, such as small hand held tanks, back pack, large mixing tanks with mechanical pumping devices, vessels with booms for spraying wide paths, or spray devices on airplanes or helicopters.
B. OSE II can be applied by eductor systems from vessels, fire trucks, etc. Set the eductor system to 2% and apply 1 gallon of mixed OSE II to each spilled gallon of hydrocarbon.

2. Concentration/Application Rate:
General - OSE II generally takes 3 to 30 minutes to penetrate the molecular walls of

hydrocarbons. However, once you spray OSE II on the hydrocarbons, OSE II attaches itself and will eventually engulf the hydrocarbons regardless of where the hydrocarbons may spread on the surface of salt or fresh water. Additionally, once you spray OSE II, the hydrocarbons cannot attach itself to the shoreline, rocks, or any equipment in its path. OSE II breaks down the adhesion properties of hydrocarbons and causes hydrocarbons to float, thereby, eliminating secondary contamination of the water column or any other areas, and holding the contaminated area to the waters surface, the original contaminated area.

- If OSE II is to be used on ocean spills or on intertidal zones OSE II should be mixed with ocean water.
- If OSE II is to be used on lakes, rivers, streams, ponds, or on land mix the product with water from a lake, stream, or pond.
- If you are performing a clean up, make sure the water used to mix with OSE II, and the water used to keep the area saturated, is the type of water normally associated with that area.
- If you use fresh water in an area normally contacted with salt water or vice versa, the different types of bacteria and competition could occur, not to mention the problems with salinity for fresh water organisms.

[Note: Do not mix tap water with OSE II if possible: Chlorine in tap water slows bacterial enhancement]

Spills on Water:
Dilute each gallon of OSE II with 50 gallons of fresh, brackish, or salt water - depending on the water associated with the area that has been impacted by the spill. Apply OSE II at a ratio of 1 gallon mixed OSE II to each gallon of hydrocarbon spilled. Apply using hand held sprayers, tank sprayers, booms from vessels, helicopters, or airplanes; by spraying the perimeter first then working toward the middle of the spilled area. Next spray the entire surface of the spill. If the spill is very heavy (more than 2 inches thick) it is recommended that OSE II be applied every day until you have met a 1:1 ratio of OSE II and water mixture to spilled oil/hydrocarbons.

- Use 1 gallon OSE II for every 50 gallons of hydrocarbons.
- Use 1 drum of OSE II for every 2,750 gallons of hydrocarbons.
- If you know gallons of hydrocarbons spilled, multiply gallons of hydrocarbons by 0.02 to get amount of OSE II needed [gallons of hydrocarbons x 0.02 = gallons of OSE II].
- If you know barrels of crude oil spilled, multiply barrels of crude oil by 0.015 to get drums of OSE II needed [barrels of crude oil x 0.015 = drums of OSE II].
- If you do not know gallons of hydrocarbons or barrels of crude oil, multiply size of spill by 0.0023 to get drums of OSE II needed or by 0.12 to get gallons of OSE II needed [(yards long x yards wide x inches thick) x 0.0.0023 = drums of OSE II or (yards long x yards wide x inches thick) x 0.015 = gallons of OSE II].

Intertidal Zone:
Mix each 55 gallon drum of OSE II with 2,750 gallons of fresh, brackish, or salt water. The water used is determined by the type of water associated with the site. OSE II should be applied as the tide recedes (if there is a tide) and once the tide comes in the application should cease until the tide recedes again. Additional applications should only be warranted if spill has been allowed time to percolate into

the depths of the soil.

If there is no tide, but waves have pushed the spill into the intertidal zone, then there will be direct access to the spill at all times. If possible use string or stakes to grid off the beach or intertidal zone area, and then you can calculate how much premixed OSE II to apply to a given area. If unable to grid off an area then calculate how much OSE II to apply and then determine how much premixed OSE II will flow through a nozzle (gallons per minute) then let application technician know how many gallons to apply in a given area and this can be determined by applying product for a certain time period to get the correct amount of OSE II applied to gain the 1:1 ratio.

Note: If the intertidal zone is associated with the sea then mix OSE II with salt water. If the spill area is in an area of brackish water then mix OSE II with brackish water. If the intertidal zone is associated with fresh water such as lakes, rivers, streams, ponds, creeks, aquifers, or drinking water wells then use fresh water to mix OSE II.

3. Conditions for Use:

OSE II can remediate hydrocarbon-based material including chlorinated hydrocarbons, PCB's, dioxins, and some pesticides.

As the age of spilled hydrocarbons increases, the time necessary for bioremediation increases. In general, fresh crude, gasoline of BTEX takes from 72 hours to 30 days to completely bioremediate.

Variations of sea water salinity should have no effect, but as long as microbial life can exist, then OSE II will be effective.

OSE II bioremediation slows somewhat at temperatures below 40°F. OSE II however, will continue to work at any liquid water temperature that will sustain microbial life.

VII. TOXICITY AND EFFECTIVENESS

a. Effectiveness:

Summary Data Table:

DAYS	PRODUCT 3 REPS/PROD	TOTAL MEAN ALKANES (ppm)	RED% 28 DAYS	TOTAL MEAN AROMATICS (ppm)	RED% 28 DAYS
0	CONTROL	43,170	-	11,435	-
	NUTRIENT	40,569	-	11,785	-
	OSE II	41,730	-	12,155	-
7	CONTROL	39,250	9.1	10,355	9.4
	NUTRIENT	34,815	14.2	9,898	16.0
	OSE II	26,316	36.9	8,072	33.6
28	CONTROL	35,797	17.1	9,534	16.6
	NUTRIENT	26,507	34.7	8,938	24.2
	OSE II	4,273	89.8	1,268	89.6

Results of Gravimetric Analysis:
Percentage (%) Decrease in Weight of Oil on Day 28
Control: 16.5%
Nutrient: 52.0%
Product: 85.4%

VIII. MICROBIOLOGICAL ANALYSIS

1. Listing of each component of the total formulation, other than enzymes, by chemical name and percentage by weight: CONFIDENTIAL
2. Enzyme Names: CONFIDENTIAL
3. I.U.B.: CONFIDENTIAL
4. Source of Enzymes: Fermentation process
5. Units: No less than 1% and no more than 50% by weight
6. Specific Gravity: 1.05
7. Optimum Conditions:
    a. pH: 7.0
    b. Temperature: 72°F
    c. Salinity Ranges: Fresh water to salt water
    d. Maximum and Minimum pH: 3.5 - 8.0
    e. Maximum and Minimum Temperature: 28°F - 128°F
    f. Maximum and Minimum Salinity Levels - Salinity level above that will support microbial activity will adversely effect OSE II's performance
    g. Enzyme Shelf Life: Up to 5 years when properly stored
    h. Enzyme Optimal Storage Conditions: 72°F is optimal, enzyme range is freezing to 120°F, never leave OSE II in direct sunlight for more than a couple of hours

IX. PHYSICAL PROPERTIES

NA

X. ANALYSIS OF HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

NA

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What is this?

PRODUCT: Oil Spill Eater II Apply for: Alternative Oil Spill Response Technologies.

OSEI Corporation

PO Box 515429 Dallas, Texas 75251

Steven Pedigo CELL# 214 783 6992 OFFICE# 972 669 3390 FAX# 469 241 0896

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Since 1989, OSEI Corp has cleaned up of over 14,000 spills as a first and only response tool. OSE II is distributed in over 35 Nations and focuses on speeding up Mother Nature. **Oil Spill Eater II (OSE II)** is the world's most environmentally safe and cost effective bioremediation process for the mitigation of hazardous waste, spills and contamination virtually anywhere of any size. It is an environmentally safe cleanup method because it uses natures own bioremediation processes to effectively eliminate hazardous materials. OSE II is listed on the US EPA's National Contingency Plan for Oil Spills (NCP), OSE II is listed in the U.S. Defense Logistics supply chain and OSE II is in the Navy DENIX system as BAA Book 18 number 14.

The process: OSE II is applied to a spill, the biosurfactants attack the molecular structure of the hydrocarbon, by breaking the spill into small particles, then the oil is solubilized which increases the oil water interface all in approximately 30 minutes. During this process the OSE II enzymes form protein binding sites that will act as catalysts to induce the enhanced bacteria to utilize the broken down hydrocarbon as a food source. Once these reactions have occurred several things become apparent, the oil is broken up, adhesion properties are diminished (which causes oil to release from marsh grass, vessels, BIRDS, marine species, beaches and more) the fire hazard is reduced (which protects responders & ports) the oil is caused to float (which prevents secondary contaminated areas) and most importantly the oil is detoxified so it can be used as a food source at which point the oil is digested to an end point of CO2 and water; and then the enhanced bacteria die off to pre spill background levels. While these reactions are occurring OSE II's nutrient system is rapidly colonizing indigenous bacteria (OSE II does not introduce non indigenous bacteria into any eco system). Once the indigenous bacteria run out of the OSE II nutrients the bacteria then utilize the only food source left, the detoxified oil. There are also constituents in OSE II once mixed and activated by natural water, cause OSE II constituents to molecularly adhere to hydrocarbons, so no matter where the current, or tidal action pushes the oil OSE II will stay with it. OSE II can be used on the surface, below the surface, on the ocean floor, in marshes, estuaries, sand or soil beaches on rocks, in bays, ports and harbors, and we have case studies and pictures at www.osei.us to prove it.

RRT 6 has had a success with OSE II on the Osage Indian Reservation. Mr. Nick Nichols of the EPA oil program, and Debra Dietrich of the EPA Headquarters and Mr. Robinson EPA, Region 9 all have first-hand knowledge of OSE II being used in San Diego Bay by the U.S. Navy for over 100 spills, over a 3 ••• year period with no adverse effects to the whales, dolphins and other ocean ecology. BP has used OSE II in Trinidad and Tobago and a refinery in Greece. Our tech package list the many OSE II toxicity tests on salt and fresh water species which shows OSE II to be virtually non toxic. OSEI Corp and OSE II are trusted and used by all 5 bodies of the U.S. Military. Please go to our website for additional documentation including our technical package along with videos which include the demonstration of OSE II on Grand Isle where the oil already had been treated with dispersants and OSE II still cleaned it up. www.osei.us

OSE II has been extensively reviewed by the Navy Environmental Health Center in Norfolk, Virginia. Mr. Jerry Drewer was our Contact: (757) 363-5540. OSE II has also been extensively tested by the Naval Research Lab in Key West, Florida: Our contact was Mr. Jan Berge (305) 293-4216. OSE II is so good OSE II is actually mentioned in other countries Coast Guard Handbooks as the first response method for cleaning up a spill. OSE II is virtually non-toxic and extremely effective in breaking down oil. Our technical package contains in depth analysis proving it in the following tests:

Salt Water Efficacy Tests:

-U.S. EPA / NETAC 21 Day & 28 Day Bioremediation Test -Biodegraded Alaskan Crude 98% in 21/28 days

-U.S. Respirosity Test – EPA determined OSE II to reduce hyrdrocarbons by 98% and aromatics by 85% which was better than any other product tested.

-University of Alaska (Dr. Brown) PAH Test – Demonstrates that OSE II with mineral nutrients and hydrocarbons is 300% more effective than without OSE II.

-Mega Borg Ship Spill in Gulf (South African Crude Oil) Test – In 216 hours OSE II lowered TPH from 100,070 ppm to 516 ppm for a 99.5% reduction.

-BETX Bioremediation Test-OSE II can even work well on Benzene, Ethyl Benzene, Toulene and Xylene ratios demonstrate the potential to biodegrade as much as 98%.

Fresh Water Efficacy Tests:

-Chevron Crude Oil Bioremediation Test-OSEII on Chevron Crude in 24 days reduced 95,200 ppm to 690 ppm or 99.8% effective on biodegrading this oil.

Soil Efficacy Tests:

-U.S. Marine Corps Base 29 Palms California (Cleanup Won Environmental Award)

Salt Water Species Marine Toxicity Tests

-U.S. EPA / NETAC Mysid Toxicity Test (this test was run twice) – LC50 Test, at 96 hours OSE II greater than 2100 mg/L.

-Both Mummichog and Artemia Salina Toxicity Test – LC50 Test, at 48 hours OSE II is 5285 mg/L.

Fresh Water Species Marine Toxicity Tests

-Rainbow Trout Toxicity Test by Environment Canada-Toxicity tests state 1000 mg/L or less is toxic. Anything higher is acceptable and considered non-toxic. OSE II, test result 10,000 mg/L = non-toxic.

Beneficial Environment Effects

-Biological Oxygen Demand for OSE II –OSE II has minimal impact on BOD, less than 7%. -Dispersant Swirling Flask Test -Proves OSE II causes oil to float

I.OSE II is mixed at a ratio of 50 gallons of water to 1 gallon of OSE II, and then applied at a 1 to 1 rat io of mixed OSE II and water to each released gallon of oil without dispersant.

II. OSE II is mixed at a ratio of 25 gallons of water to 1 gallon of OSE II, and applied at a 1 to 1 ratio of mixe d OSE II and water to each released gallon of oil in which dispersants were applied.

III. For quick more efficient mobilization of heavy oil and tar balls OSE II should be mixed at a ratio of 25 gallons of water to 1 gallon of OSE II, and applied at a 1 mixed gallon of OSE II and water to each 1 gallon of tar/weathered oil, and or tar balls.

In marshes and estuaries, or
areas where there is only a sheen, OSE II should be mixed at a ratio of 100 gallons of water to 1 gallon of O SE II and then applied 1 mixed gallon of OSE II and water to each gallon of sheen. Where there is heavy oil or tar refer to III. Above

Plumes need a slight amount of pressure from the nozzle to the edge of the plume. Enough pressur e to broadcast the OSE II and water mixture into the plume edge. Measurements of plume thickness will n eed to be determined as to how much OSE II to apply to a given yard or meter of plume edge.

VI. For all booms, vessels, docks, or any material that come into contact with oil dispersed or otherwis e, OSE II shall be mixed at a ratio of 25 gallons of water
to 1gallon of OSE II and applied until oil mobilizes from the surface of material.

NOTE: Based on a counter showing 243,600,000 gallons of oil lost to date June 17,2010.

VII. Approx.
volume of oil dispersed is 10,000,000 which will require a ratio of 25 gallons of water to 1 gallon of OSE II. This would require 10,000,000 divided by 25 equals a requirement of 400,000 gallons of OSE II

VIII. Approx. volume of oil released without dispersant is 233,600,000 which will require a ratio of 50 gallons of water to 1 gallon of OSE II. This would require 233,600,000 divided by 50 equals a requirem ent of 4,672,000 gallons of OSE II needed.

IX. Approx. volume of dispersant used 1,000,000 will require a ratio of 50 gallons of water to 1 gallon of O SE II. This would require 1,000,000 divided by 50 equals 20,000 gallons of OSE II.
X. Varying volume, has an approximation of oil and dispersant at 245,600,000 gallons, and
this would require 5,072,020 gallons of OSE II
IX. We have readied and worked out calculations to apply OSE II by 747 aircraft, air boats for marshes and estuaries, and have discussed how to out fit average vessels with pumps and fire fighting induction syste ms, for beaches on Islands and remote areas, and electric back pack sprayers can be used for some areas a s well.

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OSEI Corporation Summary of Testing Done on OSE II by Dr. Tsao of British Petroleum at LSU Laboratories Regarding the Effectiveness of OSE II on Remediating Oil from the Deepwater Horizon, Macando Oil Blow Out in The Gulf of Mexico 2010/2011

The major oil company British Petroleum tested the OSEI Corporation's product called Oil Spill Eater II (OSE II) at Louisiana State University from November 2010 through approximately January 2011. Relevant sections of BP's BCST (Bio Chem Strike Team) test results and summary "interim report" are attached.

OSE II was tested at our normal mixing and application rate as laid out in the protocols we provided. OSE II was applied to Louisiana sweet crude from Bay Jimmy, Louisiana. This oil had the additional components of Exxon's chemical dispersant product called "Corexit", as this dispersant had been applied to it in the field as a part of the BP spill response actions.

British Petroleum formed a group named the Bio Chem Strike Team (BCST). Under the direction of Dr. Tsao, BCST was established in response to the Deepwater Horizon incident by the Alternative Response Technology (ART) program. The BCST consisted of experts from BP, LSU, LDEQ (Louisiana Department of Environmental Quality), USCG (U.S. Coast Guard), OSPR (California), SCAT, and highly experienced oil spill response consultants. Furthermore, BCST operated in conjunction with advice from EPA and NOAA. The overall stated objectives of the BCST were to evaluate the thousands of alternative approaches that were submitted as potential solutions to the oil cleanup. Through the ART system, those biological and chemical technologies were to be determined as to which ones best met the needs of Unified Command on oil spill cleanup. In order to accomplish this, the team reviewed and subsequently determined which technologies would undergo "desktop evaluations" (literature review), laboratory scale testing (at the aquatic toxicology laboratory at Louisiana State University (LSU), and/or field testing. Ultimately, the results of this

work by the BCST would provide recommendations for best available technologies for use by the Unified Command.

The OSEI Corporation submitted information about our product, OSE II, and, as a result, OSE II has been put through an exhaustive review by the BCST group from June 2010 until the OSEI Corporation received an email from Dr. TSAO stating OSE II had made it through their tier reviewed process of four tiers. BP had stated earlier that only a few products would be capable of making it through their review process.

OSE II was then slated for testing and the tests were started in November of 2010, and concluded in January of 2011. The tests were very thorough and measured several pertinent aspects in regards to remediating hydrocarbons/oil. The tests were conducted with Gas Chromatograph Mass Spectrometry EPA test procedures. Bacteria counts, as well as dissolved oxygen, nitrogen, and phosphorous levels were measured, and PAH and Alkane degradation was quantified.

The results from the tests of OSE II were excellent and demonstrated the statements we have made to BP regarding the effectiveness of the product as being factual. The first week's test results tracked exactly with the thousands of tests that have been performed on OSE II by universities around the world, as well as the many legal "closure" letters we have received which are required to verify the completion of a cleanup project in the U.S.

The week-two test showed that additional PAH's had been unexplainably added to the test; however, the reduction of PAH's 2 weeks later showed that, despite the unexplained addition of PAH's in the second week, even greater remediation of the PAH's had occurred. The inexplicable addition of PAH's to the OSE II test vials, however, may have slowed the final results somewhat.

The test measured Alkanes which is a component of oil that has limited toxicity to the environment and aquatic life. PAH's are called poly cyclic aromatic hydrocarbons and have been denoted by the US EPA as the most persistent toxic component of oil, and are the hydrocarbons they deem to be the ones most in need of remediation.

OSE II showed a great ability in the closed laboratory test to be able to remediate PAH's, as well as the Alkanes. In fact, by the conclusion of the testing time frame, OSE II had remediated 80% of both components of the oil released by BP which ended up in Bay Jimmy, Louisiana. It is very important to note that laboratory tests actually hinder OSE II's ability to remediate oil, due to the fact that, in a closed laboratory setting, there is less available indigenous bacteria to enhance, less wave action, and less oxygen. Therefore, one can easily predict that the percentage of results seen in the same time frame in the Gulf of Mexico waters and environment

will be far greater, as has already been shown in the many real field tests and clean-up projects we have done.

One aspect of the BP spill in the Gulf of Mexico is the fact that the water column is being depleted of oxygen because of the dispersants sinking oil into the water column. The BCST test verified OSE II has minimum negative impact upon the oxygen level.

This test by a major oil company is the second major testing of OSE II on two of the largest spills on water in the history of planet Earth caused by Man. Exxon tested OSE II in 1989 at Florham Park, New Jersey and discovered OSE II was the most effective product in the world by a factor of better than 90% on the North Slope Alaskan Crude oil from the Valdez spill. This was verified by Dr. Brown of the University of Alaska and Steve Hinton, a chemical engineer for Exxon. Upon the completion of that test, both of these men called the OSEI Corporation alerting Steven Pedigo of the success of its results, which were like none they had ever seen before.

BP has now successfully tested OSE II on their spill in the Gulf of Mexico which is estimated, at this time, to be over 6,000,000 gallons of oil spilled.

Dr. Tsao wrote in his report "**After nearly one year since the Deepwater Horizon spill, residual weathered oil remains in many locations. The need for a field trial to establish operational criteria for final bioremediation work plans should be initiated before early Spring 2011.**"

The OSEI Corporation has alerted BP that, after over 16,000 spill clean ups in the past 21½ years, the logistics in regard to the successful application of OSE II were worked out some time ago. We have also let BP know that OSE II has been demonstrated several times on their Gulf of Mexico blow out on sandy beaches and marsh grass. They can see the video on our Website under "News videos, WLOX TV in Mississippi" where OSE II was demonstrated on Waveland beach for MS State Senator Gollot and the RRT IV team.

The remediation of the PAH's also verifies that OSE II is an extremely effective <u>first response</u> bioremediation product, and has among its many benefits:

1) it causes the oil to float which limits the negative toxic impact to the water column or ocean floor of the oil and dispersant,

2) it causes the reduction of the adhesion properties so the oil cannot stick to birds, grass, rock or sand on shorelines,

3) it causes the elimination of fire hazard,

4) it has been proven to be non-toxic by the numerous formal toxicity tests, the fact that you can safely wash your hands with it, and the TV news program in which Retired Rear Admiral Lively drank some of it.

5) Boom deployment actually works and can help when OSE II is used because OSE II causes the oil to float,

6) Although OSE II causes the oil to float, because of the method in which it goes to work on the oil, it is still very difficult to see,

7) it has a defined end point of turning the oil into water and CO2.

All of the above clearly demonstrate that it is the best and only needed oil spill response and that it will, even at this late date, remediate both fresh and weathered oil and dispersant currently in the Gulf.

Steven Pedigo
Chairman/CEO OSEI Corporation

Laboratory Screening of Commercial Bioremediation Agents for the Deepwater Horizon Spill Response

Report

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This report provides a brief summary of findings to date for OSE II from the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) Product Schedule.

1.0 Introduction and Summary of Methods

The BioChem Strike Team (BCST) was established in response to the Deepwater Horizon incident by the Alternative Response Technology (ART) program. The BCST consisted of experts from BP, LSU, LDEQ, USCG, OSPR (California), SCAT, and highly experienced oil spill response consultants. Furthermore, the BCST operated in conjunction with advice from EPA and NOAA. The overall objectives of the BCST were to evaluate among the thousands of submissions of alternative approaches through the ART system, those biological and chemical technologies that best meet the needs of Unified Command on oil spill cleanup. In order to accomplish this, the team reviewed and subsequently determined which technologies would undergo desktop evaluations (literature review), laboratory scale testing (at the aquatic toxicology laboratory at Louisiana State University, LSU), and/or field testing. Ultimately the results of this work by the BCST will be to provide recommendations for best available technologies for use by the Unified Command.

This interim report summarizes Oil Spill Eater II (OSE II) evaluated at the laboratory scale. Specifically, the BCST determined that OSE II a product listed on the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) Product Schedule warranted further testing to determine effectiveness in degrading oil under the specific environmental, climate, and ecological conditions generated by the 2010 Gulf oil spill. Using pre-defined test protocols, OSE II was evaluated and compared to natural (inherent) biodegradation occurring through indigenous microflora and micronutrients present in Gulf waters. The selected product was analyzed in a controlled flask-study to determine the remediation potential on weathered crude oil recovered from south Louisiana marshes.

It should be noted this shows only OSE II, as established by OSEI Corporation to eliminate un-needed data to reduce confusion.

2.0 Materials and Methods

The experimental design protocol specified a flask study, incubated at room temperature on a consistently rotating, 200 rpm, orbital shaker. The samples were sacrificed over 5 separate sampling events including Time 0, 1, 2, 4 and 12 Weeks. The original protocol called for the last sampling event to occur at 8 weeks. However, the final sampling event was changed to 12 weeks while the backlog of analytical characterization for the earlier

samples was being worked through. Each flask was analyzed for total nitrates (NO3 -), total phosphates (PO4 3-), total organic
carbon (TOC), total alkanes, total polyaromatic hydrocarbons (PAHs) and the physical parameters, pH, dissolved oxygen (DO) and temperature. Specific aromatic fractions were also analyzed, but the full dataset is not reported here.

2.1 Chemical Analyses

2.1.1 GC/MS Methods

Extraction of PAHs and alkanes in water-amended with oil follows methods outlined in EPA Method 8270 series. Approximately 100 ml of water is poured into a 250-ml separatory funnel and adjusted to a pH of 7. A 30-ml aliquot of dichloromethane is added to the separatory funnel and spiked with a known amount of standard surrogate. The funnel is capped and shaken for approximately 3 minutes, venting occasionally to remove solvent pressure. The solvent and water are allowed to separate and the solvent is drained through an anhydrous sodium sulfate funnel into a 250-ml flat-bottom flask. The solvent addition and draining step are repeated 2 more times. The sodium sulfate funnel is rinsed with dichloromethane and allowed to drain completely. The flat-bottom flask is then placed on a rotary evaporation system and concentrated to a volume of 5-10 ml dichloromethane and placed in a calibrated extraction thimble. If concentrating is necessary, the extract volume is placed under a nitrogen blow down concentrator and reduced to a volume of 1.0 ml. The dichloromethane extract is exchanged to hexane using approximately 4-5 ml of hexane. A micro distillation column is added to the extraction thimble and placed in a hot water bath. The dichloromethane is evaporated off and the remaining hexane extract is reduced to a volume of 1-2 ml. The hexane extract is placed beneath a nitrogen blow down device and reduced to a final volume of 1.0 ml hexane.

2.1.2 GC/MS *Instrumental analyses*

After addition of internal standards, samples were analyzed using an Agilent 7890A GC fitted with a 0.25 mm i.d. °—30 m HP-5MS column and an Agilent 7683B autosampler. The injector was set to 250°C and the detector to 280°C. Detection of analytes involves the utilization of a HP 5975C Inert XL Series Mass Selective Detector operating in the Selected Ion Monitoring mode. The column was held at 60°C for 1 min and then ramped at 25°C/min to 160°C followed by 3°C/min to 268°C and 12°C/min to 300°C, where it was held for 8 min. Concentrations of parent PAHs were based on calibrations using a five-point curve which were checked for each batch of samples analyzed. Concentrations were reported on a dry weight basis. Approximate alkylated PAH concentrations were calculated assuming the same response factors for each parent and corresponding alkylated analogues. For alkylated phenanthrene/anthracenes, the results were reported as pairs to incorporate the uncertainty of the measurements and quantification based on the average response factor of the individual parent PAHs.

2.2 Other analytical approaches

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A. Water quality analysis

- DO, pH, temperature and salinity were measured using standard field equipment,(YSI 85-10 meter) appropriately calibrated.
-

B. Microbial analysis
  - Microbial activity was measured by epifluorescence direct cell count (EDCC) for Most Probable Number (MPN).

C. Nutrients
  - Total phosphates (PO4 3-) using EPA 365.4, total nitrates (NO3-) using standard method 4500-NO3 F modified and total organic (TOC) using US EPA Method 9060.

3.0 Screening Protocol

3.1 *Preparation of Oiled Flasks*

The crude oil and Gulf water used in the study were recovered in Bay Jimmy (coordinates:29°27'238" N, 89°53'510" W) on August 20, 2010. A half (0.5) g of weathered crude oil were weighed out and deposited in the bottom of a sterile 250 ml Erlenmeyer flask. Before the oil was added to the flasks, each flask was rinsed with de-ionized water and autoclaved to ensure sterility. Ten (10) ml of the solvent Dichloromethane (DCM) was added to the flasks and the flasks were placed on the shaker table for approximately 10 minutes until the oil had completely dissolved in the DCM. The flasks were then left uncovered under a ventilation hood to allow the DCM to flash off, leaving a ring of crude oil on the bottom of each 250 ml test flask.

Each of the 180 test flasks, including the 30 control flasks and 150 product flasks, were prepared in this exact manner.

3.2 ***Preparation of Controls***

controls were prepared in triplicate for each of the five sampling events.

- Negative Control treatments consisted of 100 ml of sterile Gulf water and 0.5 ml of weathered crude oil per test flask. As in all other test flasks, 0.5 ml of oil were dissolved in 10 ml of DCM, creating a coating of weathered oil in the bottom of each flask. 100 ml of autoclaved Gulf water was then added to each flask. No nutrients were added.

- Positive Control 1 treatments consisted of 100 ml of Gulf water and 0.5 g dissolved oil per flask. No nutrients were added. As in all other test flasks, 0.5 ml of oil were dissolved in 10 ml of DCM, creating a coating of weathered oil in the bottom of each flask.

- Positive Control 3 treatments required a solution of 0.09g of hexadecane and 0.01g of chrysene per flask containing 100 ml of Gulf water. Based on the difficulty

of accurately
weighing 0.01 and 0.09 grams of each component, a stock solution of hexadecane

and chrysene in Dichloromethane (DCM) was prepared. The solution could then be accurately pipetted into each test flask. The calculations to produce 30 ml of solution are as follows:

3.3 Stock solutions

30 ml of DCM containing 0.01 g chrysene per ml DCM and 0.12 ml hexadecane per ml DCM

30 ml DCM contained 0.3 g chrysene and 3.6 ml hexadecane 0.3 g of chrysene were added to 30 ml of DCM and allowed to dissolve. Once dissolved,3.6 ml of hexadecane was added to the chrysene/DCM solution. One (1) ml of the composite solution was then added to each Positive Control 3 test flask. Based on the passive volatilization of DCM as compared to hexadecane and chrysene, the DCM was flashed off under a vented hood in order to leave the desired amount of chrysene and hexadecane in the bottom of the test flask. Nutrients were also added to each flask.
The final Positive Control 3 flasks consisted of 100 ml of Gulf water, 0.5 g crude oil, 0.25 g KH2PO4 and 0.5 g NH4NO3 and 1 ml of the solution of hexane and chrysene described above.

3.4 Preparation of Products

The following products were added to triplicate flasks using formulations and approaches provided by product representatives to LSU.

Oil Spill Eater (OSEII)

Nutrients Added: No

Based on the manufactures ratio describing the application of the product to dispersed oil, 0.5 ml of OSE II was added to each test flask.

4.0 Findings

OSE II, tested in the laboratory screening study is listed in the U.S. Environmental Protection Agency's (USEPA) Office of Emergency Management Regulatory and Policy Division's National Oil and Hazardous Substances Pollution Contingency Plan (NCP) Product Schedule.

OSE II demonstrated the ability to biodegrade and/or reduce total concentrations of the weathered oil (including alkanes, PAHs) recovered from Bay Jimmy. Additionally, the flask study has verified that the remaining dispersed and weathered oil in coastal environments along the Louisiana and northern Gulf of Mexico will continue to biodegrade. **(The prior statement has been refuted by the Woods Hole Oceanographic Institute.)**

This is not a new finding and has been the opinion of many scientists as a reasonable outcome for any oil spill affecting the coastlines of Gulf States. However, the study does demonstrate the need for accelerated biodegradation strategies so as to minimize the toxicological legacy of the spill over time.

Data sets are included in Appendix A of the report. Representative chromatograms for the first four weeks of the study are in Appendix B.

Microbial cell counts using epifluorescence direct cell count (e.g. MPN) revealed that all samples contained natural and/or supplemented microbial populations above 106 viable cells per ml.

Specific findings for control and commercial products are as follows:

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Negative Control: The negative control flasks consisted of weathered oil added to sterile Gulf water. The flasks indicated minimal reductions in alkanes and PAHs over the 12 week period. Total alkanes from time 0 to week 12 were reduce 14.2% and total PAHs were reduced 14.2% over the same time period.

Positive Control 1: The series of control flasks consisted of weathered oil added to non-sterile Gulf water with no additional nutrients. Data sets demonstrated an 11.9% increase in total

alkanes over the 12 week period. Based on the variability of 0.5 gram oil measurements within each flask, this slight increase is an acceptable result for the Control 1 data series. Additionally, visual observation over the 12 weeks indicated minimal degradation of oil. However over the 12 week study, the total PAH concentration was reduced only 28.6%. The Positive Control 1 data series suggested microbial activity produced modest reductions in weathered oil. This is consistent with earlier USEPA studies indicating the need for nutrient amendment so as to maintain steady biodegradation/mineralization. **This was not the case for OSE II.**

Positive Control 3: Positive control 3 consisted of site water with indigenous microflora and the chrysene/hexadecane additive as primary carbon sources. No weathered oil was added to the flask series. A 32.6% reduction in chrysene was demonstrated over the 12 week test period.

Oil Spill Eater (OSE II): OSE II is a biological enzyme additive and the product was added to non-sterile site water and weathered oil. By the end of the 12 week test period, 80.1% of the alkane constituents and 79.2% of the PAH constituents were degraded.The product degraded more of the PAH components than Positive Control 2 and about the same percent of alkanes.
NOTE: if you include the 2nd week spike then the total degradation was approximately over 4 times any controls degradation.

OSE II showed the ability to degrade both components of weathered crude oil equally well. [emphasis mine]

5.0 General Discussion

As a general trend, the PAH groups including C1-C3 Phenanthrenes, C3 and C4 Pyrenes as well as C2 and C3 Fluorenes were left intact by the end of 12 weeks. The PAHs of toxicological concern including the Benzo constituents were degraded in every treatment flask. As expected, the shorter-chain alkanes including nC10 to nC14 were most often thoroughly degraded by the end of 12 weeks, while the heavier chains were left in greater concentrations. Importantly to the time frame of the field trials, the greatest reduction in PAHs by OSE II occurred over 4 weeks. The PAH concentration then returned to elevated levels in the weeks between sampling event four (week 4) and five (week 12), for the controls and other products, however this did not occur for OSE II, as the test data shows, OSE II showed continued remediation of the PAH's throughout the duration of the test.

The current laboratory study showed that OSE II an NCP product can promote the conversion, or biodegradation, of oil to CO2, biomass and water. The study has also demonstrated that nitrogen and phosphorous amendments also work to enhance in the degradation of oil under controlled closed systems. (while the fertilizer in this closed study showed some ability to reduce the alkanes the least toxic component of oil, however the concentration of fertilizer used would preclude its use in aquatic eco systems due to the fact that at these high concentrations of nitrogen and phosphorous used for this test, you would cause P12

the water to become toxic to aquatic life) Data sets from earlier EPA research into remediation of spilled oil argued that the limiting factor for biodegradation/mineralization is dependent upon the availability of nitrogen and phosphorus. Other factors such as temperature, salinity and dissolved oxygen may affect not only nutrient availability but also acclimated biomass performance. Field demonstration trials are needed to document the efficacy of bioremediation products on weathered oil and to determine their net contribution to biodegradation/mineralization.

After nearly one year since the Deepwater Horizon spill, residual weathered oil remains in many locations. The need for a field trial to establish operational criteria for final bioremediation work plans should be initiated before early Spring 2011. [emphasis mine]

The following 3 paragraphs were written by Steven Pedigo of the OSEI Corporation.

The EPA was sited above as arguing that the limiting factor in remediation of oil is mineral nutrients (fertilizer). The EPA has tried unsuccessfully to utilize fertilizer/mineral nutrients in aquatic spill situations in fast release, and slow release versions. They have failed numerous times with the application of fertilizers. Dr. Al Venosa of the EPA Cincinnati Research and Development lab attempted to utilize fertilizer in the Delaware River on an oil spill several years ago. He tried a starting concentration of fertilizer and could not produce any results since in the field you have to deal with dilution in aquatic scenarios. Dr. Venosa became frustrated and loaded up a high concentration and applied it to the spill, he caused the water to become toxic with too much nitrogen which created a large fish kill.

The EPA also tried to clean up a spill on the Osage Indian reservation in 2003/2004 with fertilizer on the shores of a creek. Oil had coated the creek for several miles from a pipeline break. After fertilizer failed to produce any results the EPA utilized OSE II in cold temperatures and in 45 days the oil had been cleaned up to the State of Oklahoma DEQ's acceptable levels.

The problem with fertilizers is the question of how much do you use. If you use too much, it kills the aquatic life. There is no reason to risk the adverse affects to aquatic life when you can use OSE II, a product whose application ratios do not create a toxicological problem for aquatic life.

(End of the interjection by Steven Pedigo.)

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Appendix A. Data sets from shaker flask studies

Data sets for the first 8 products with controls are presented for the 12 week screening period.
Data sets are incomplete on two additional products added later in the study.
Screening studies for these two products were initiated in December 2010. They will be included in the final report.

Time = 0 11/10/2010

Flask Series	NO3 N mg/L	PO4 3 mg/L	TOC mg/L	Alkanes mg/kg	PAHs mg/kg	pH	DO mg/L	Temp °C

Negative Control								
A			2.20	0.00	7.29	27400	394	
7.96	9.5	25.0						
B			1.90	0.00	8.20	28200	415	7.96
9.5	25.0							
C			2.30	14.60	7.56	28200	415	7.96
9.5	25.0							
Positive Control 1								
A			1.40	21.80	6.60	21300	452	7.96
9.5	25.0							
B			3.50	7.40	7.56	19900	437	7.96
9.5	25.0							
C			1.60	0.00	7.00	22400	423	7.96
9.5	25.0							
A			1.70	0.00	8.77	0	12100	7.96
9.5	25.0							
B			1.00	0.00	7.96	0	12500	7.96
9.5	25.0							
C			1.70	0.00	8.54	0	11100	7.96
9.5	25.0							
Oil Spill Eater II								
A			1.00	2.90	12.46	17000	486	7.96
9.5	25.0							
B			0.80	2.00	11.61	18600	533	7.96
9.5	25.0							
C			1.40	1.20	12.58	20100	500	7.96
9.5	25.0							

Time = 1 Week 11/17/2010

Flask Series	**NO3□□N mg/L**	**PO4□ mg/L**	**TOC**	**Alkanes mg/kg**	**PAHs mg/kg**	**pH**	**DO mg/L**	**Temp °C**
Negative Control								
A	1.10	0.00	9.64	20500	390	8.01	5.75	23.4
B	1.10	0.00	9.95	21800	414	8.06	5.10	23.4
C	1.20	0.80	10.51	28000	551	8.06	4.88	23.4
Positive Control 1								

A		1.10	0.00	7.56	19200	368	7.88
4.38	24.0						
B		0.80	0.00	7.50	19900	376	7.93
4.44	24.3						
C		0.90	0.00	7.50	17700	301	7.96
4.39	24.0						
Positive Control 3							
A		0.50	0.00	5.63	0	17700	7.95
4.32	24.0						
B		1.60	0.00	4.91	0	17600	7.97
4.61	24.0						
C		0.90	0.10	7.29	0	14100	7.98
4.61	24.0						
Oil Spill Eater II							
A		0.60	0.00	28.56	7570	306	7.49
3.23	24.4						
B		1.30	0.00	28.97	8940	328	7.42
3.17	24.2						
C		1.10	0.00	32.83	9790	387	7.40
3.16	24.2						

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Time = 2 Weeks 11/24/2010

Flask Series	**NO3 N mg/L**	**PO43 mg/L**	**TOC**	**Alkanes mg/kg**	**PAHs mg/kg**	**pH**	**DO mg/L**	**Temp °C**
Negative Control								
A	1.00	0.0	9.30	10400	521	7.82	4.80	23.5
B	0.60	0.2	9.87	10500	499	7.89	4.74	24.1

C	1.10	0.0 9	.85	9110	390	7.92	4.72 24.2
Positive Control 1							
A	1.20	0.0	9.29	10500	487	7.90	4.53 24.3
B	1.10	0.0	6.41	4990	215	7.95	4.37 24.3
C	0.60	1.0	8.15	9630	572	7.96	4.57 24.4
Positive Control 3							
A	0.90	0.6	10.54	0	16800	7.91	4.56 24.5
B	1.60	0.0	9.23	0	18700	7.96	4.20 24.5
C	1.20	0.0	10.54	0	17000	7.96	4.49 24.8
Oil Spill Eater II							
A	1.00	0.0	32.49	4050	914	7.70	3.84 25.8
B	1.60	0.5	33.57	3190	981	7.70	3.70 25.7
C	1.40	0.0	30.81	4280	940	7.70	3.73 25.9

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Time = 4 Weeks 12/8/2010

Flask Series	NO3□□N mg/L	PO43□ mg/L	TOC	Alkanes mg/kg	PAHs mg/kg	pH	DO mg/L Temp °C
Negative Control							
A	0.6	0.0	12.80	13900	267	7.87	4.61 24.2
B	0.6	0.1	13.49	14200	254	7.93	3.99 24.1
C	0.9	0.0	11.72	14300	269	7.97	4.57 24.4
Positive Control 1							
A	0.8	0.0	9.95	11500	67.7	7.93	4.47 25.1

B		1.1	0.0	13.04	1330	99.5	7.97	4.56
25.2								
C		0.8	1.0	11.61	11800	73.1	7.98	4.01
25.4								
Positive Control 3								
A		0.6	0.4	10.68	0	19100	7.86	
4.28	25.4							
B		0.9	0.0	10.45	0	18800	7.90	
4.15	25.7							
C		0.8	0.0	10.47	0	19500	7.92	
4.22	DNR							
Oil Spill Eater II								
A		1.1	0.0	36.43	3230	219	7.68	
3.37	25.2							
B		1.1	0.4	39.11	4070	308	7.66	
3.94	25.4							
C		0.9	0.0	26.02	4490	310	7.73	
4.30	25.3							

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Time = 12 Weeks 2/3/2011

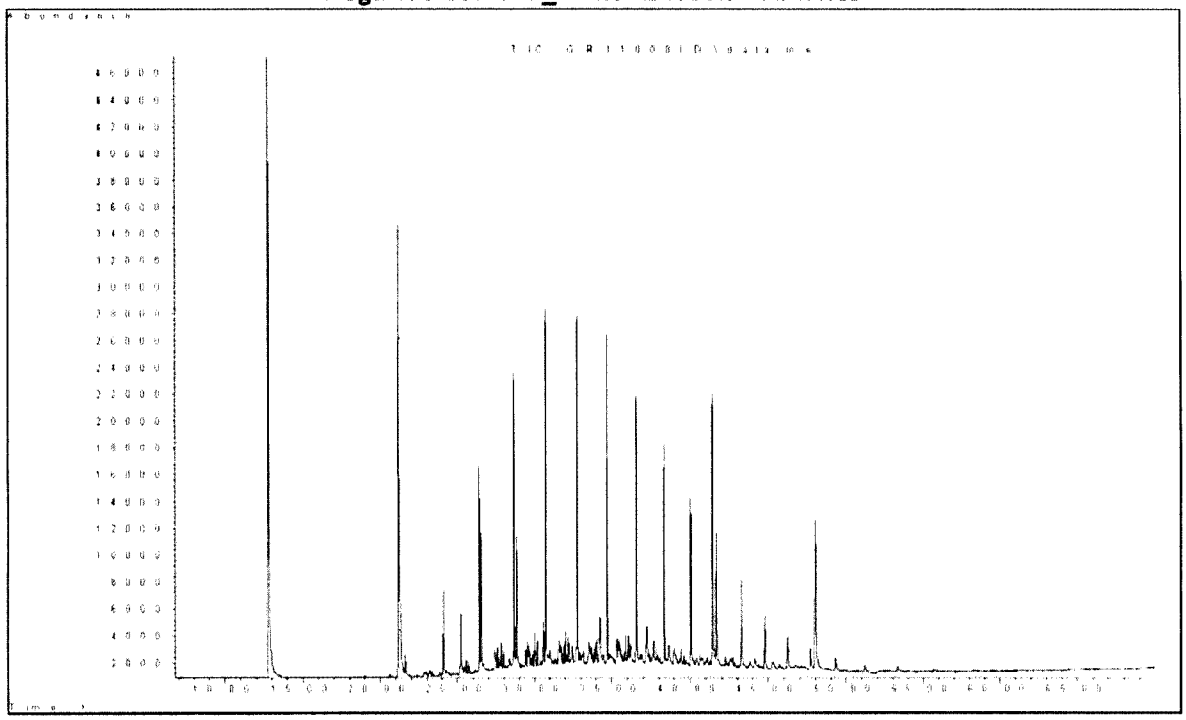
Flask Series	**NO3 mg/L**	**N mg/L**	**PO43 mg/L**	**TOC**	**Alkanes mg/kg**	**PAHs mg/kg**	**pH**	**DO**	**Temp °C**
Negative Control									
A	0.7				25100	401	7.81	5.58	
22.1									
B	0.6				23400	309	7.89	4.81	
22.1									
C	0.9				23400	341	7.96	5.02	
22.3									
Positive Control 1									
A	0.5				25100	341	7.77		
4.90	21.9								
B	0.7				23000	291	7.78		
4.61	21.9								
C	0.4				24100	303	7.91		
5.03	22.4								

Positive Control 3					
A	0.3		0	12500	7.88
4.70	22.1				
B	0.5		0	13800	7.93
4.72	22.1				
C	0.4		0	12100	7.96
4.64	22.3				
Oil Spill Eater II					
A	0.6		4050	47.6	7.71
4.90	21.1				
B	0.6		5560	143	7.74
4.70	21.2				
C	0.9		1450	124	7.82
4.58	21.4				

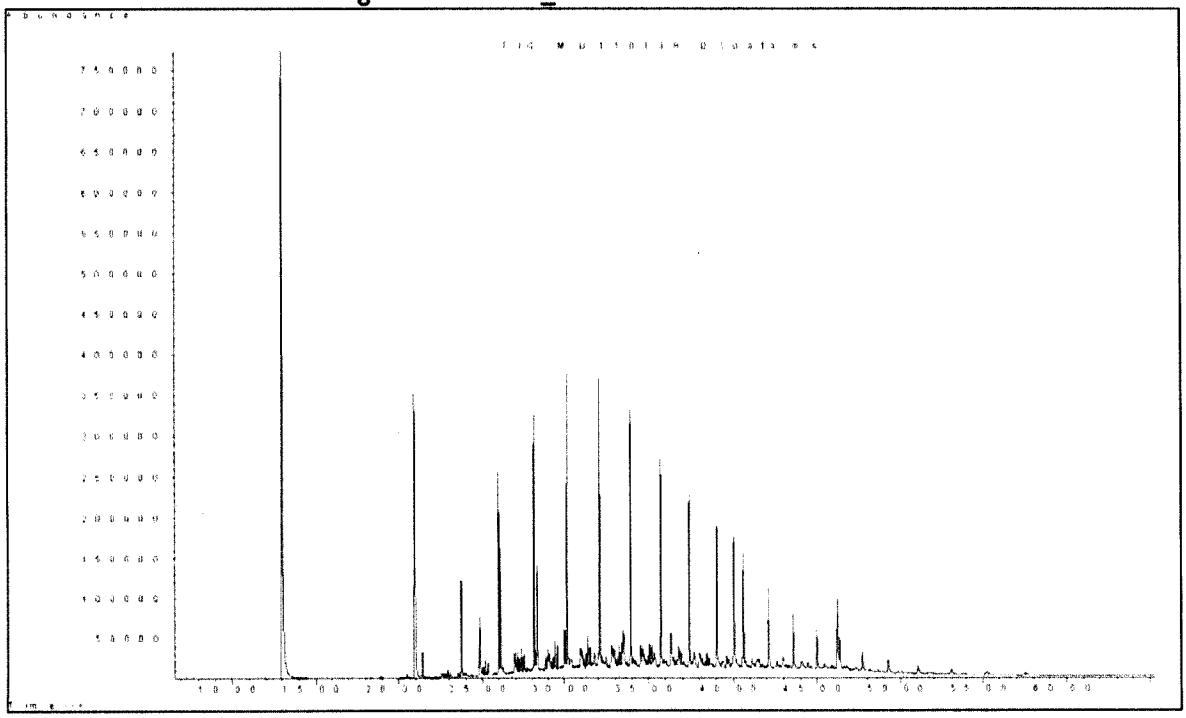
Appendix B. Chromatographs of Extracted Flasks Over Time

Data sets presented are for total alkanes from Weeks 1 through 4 of the study. Chromatographs from
Week 12 showed minimal changes as compared to Week 4. They will be included in the final report.

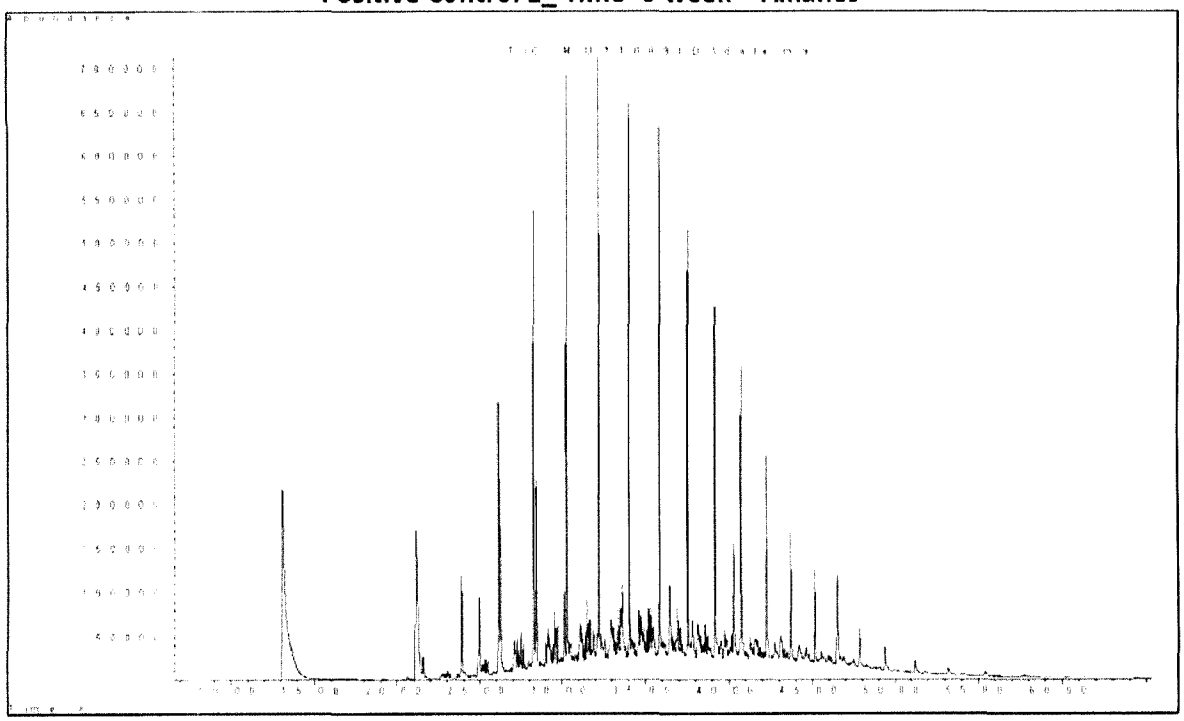
Negative Control _ Time=2 week – Alkanes



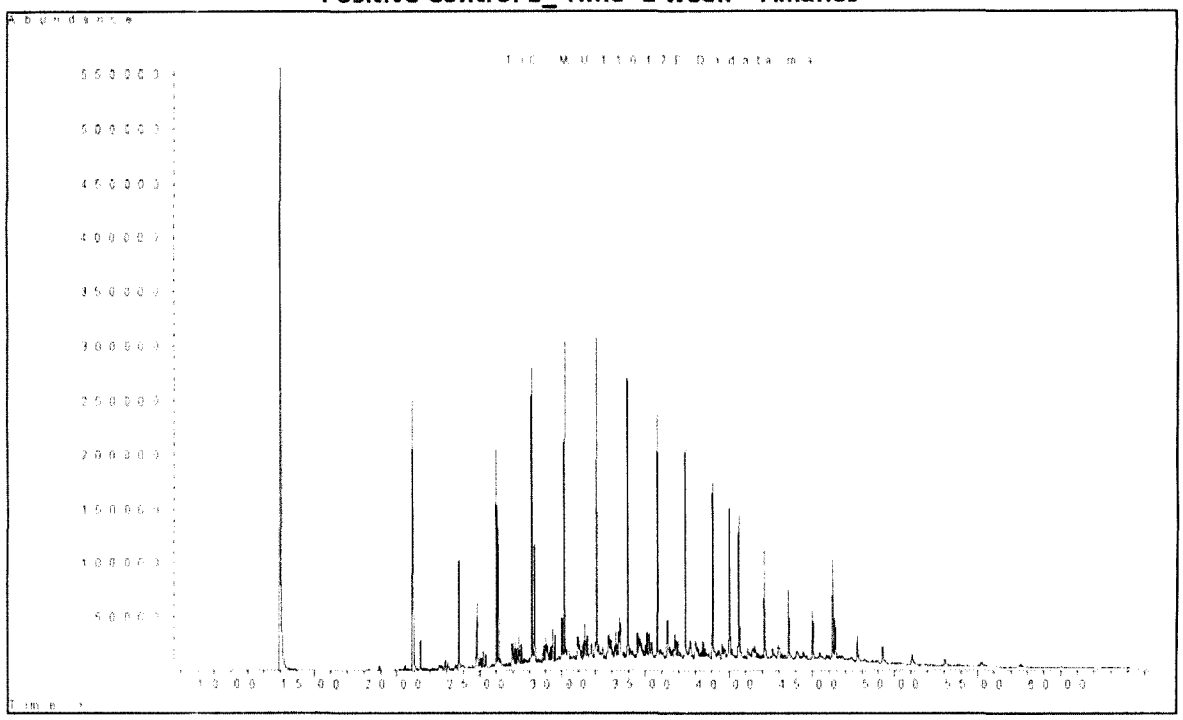
Negative Control _ Time=4 week – Alkanes



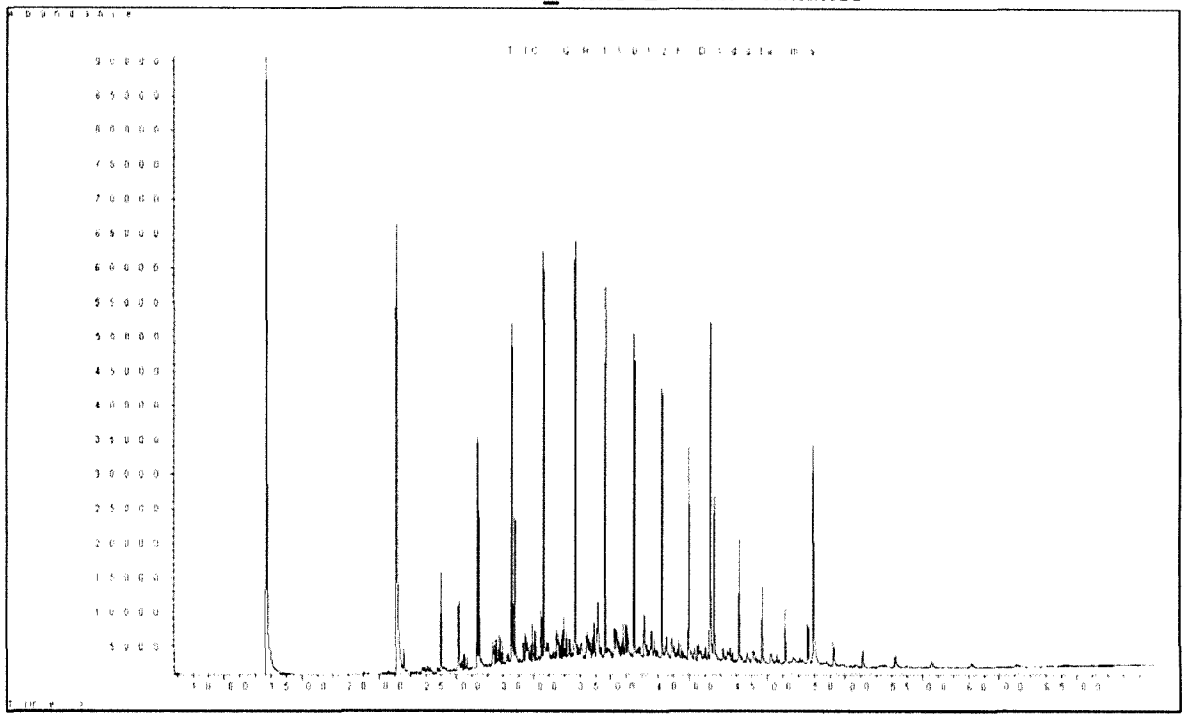
Positive Control 1_ Time=0 week – Alkanes



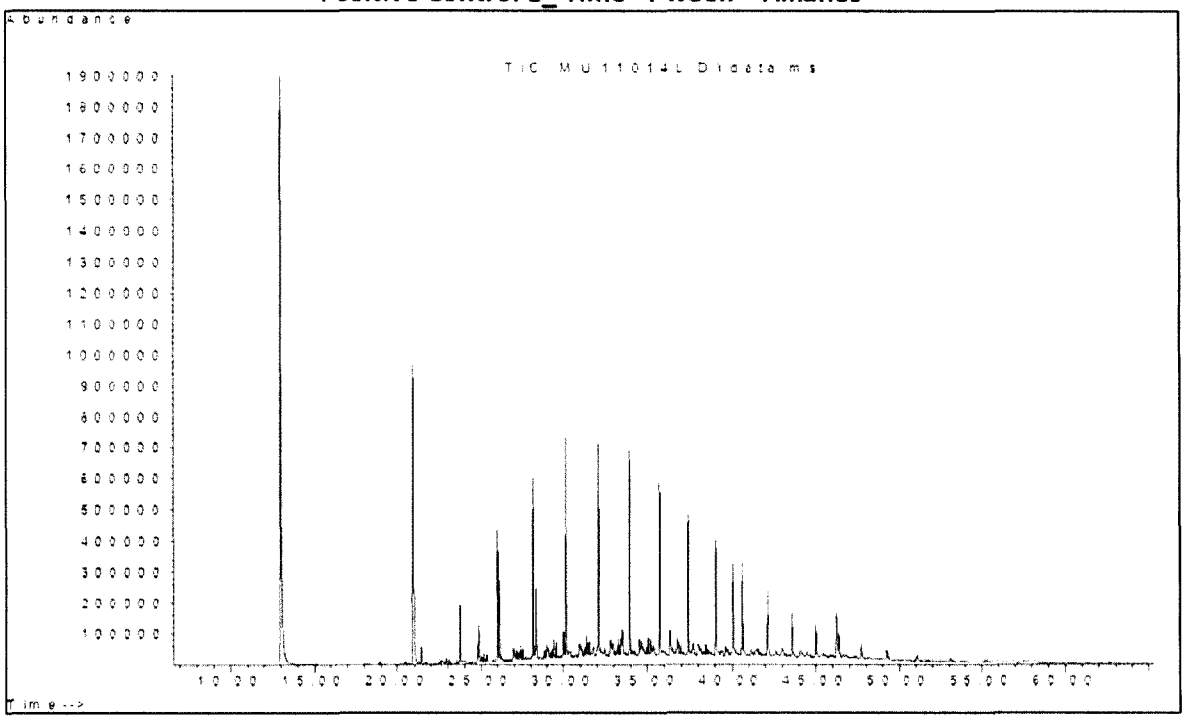
Positive Control 1_ Time=1 week – Alkanes



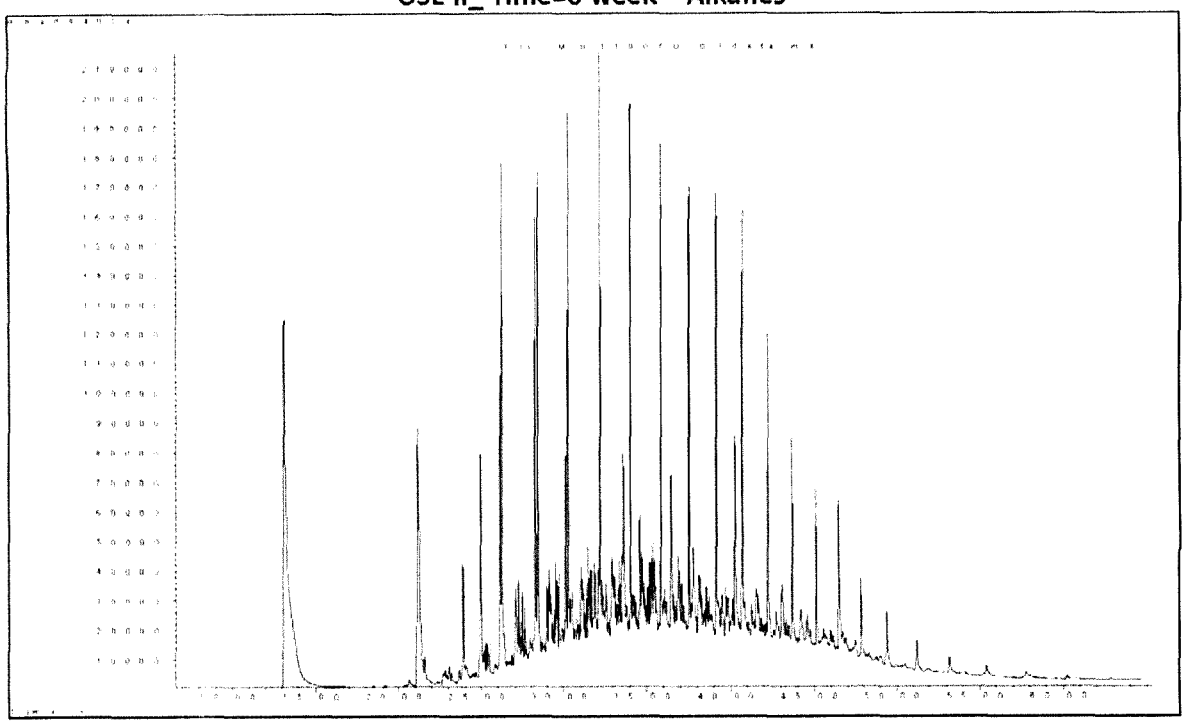
Positive Control 1_ Time=2 week – Alkanes



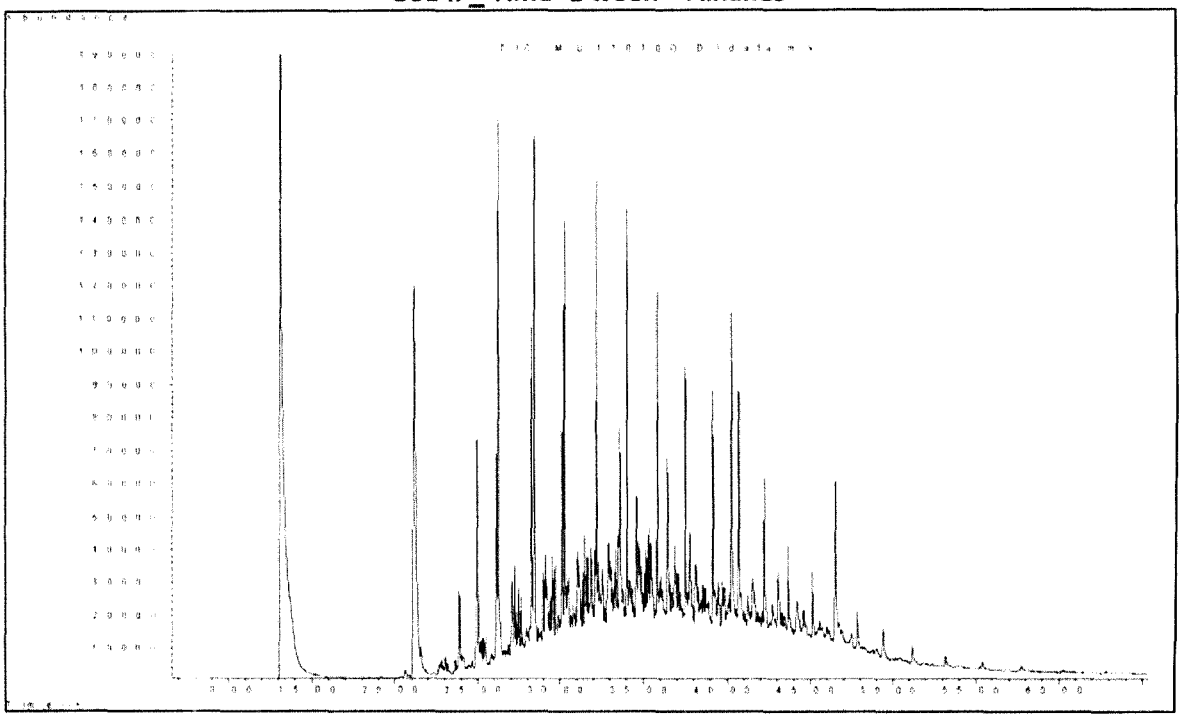
Positive Control 1_ Time=4 week – Alkanes



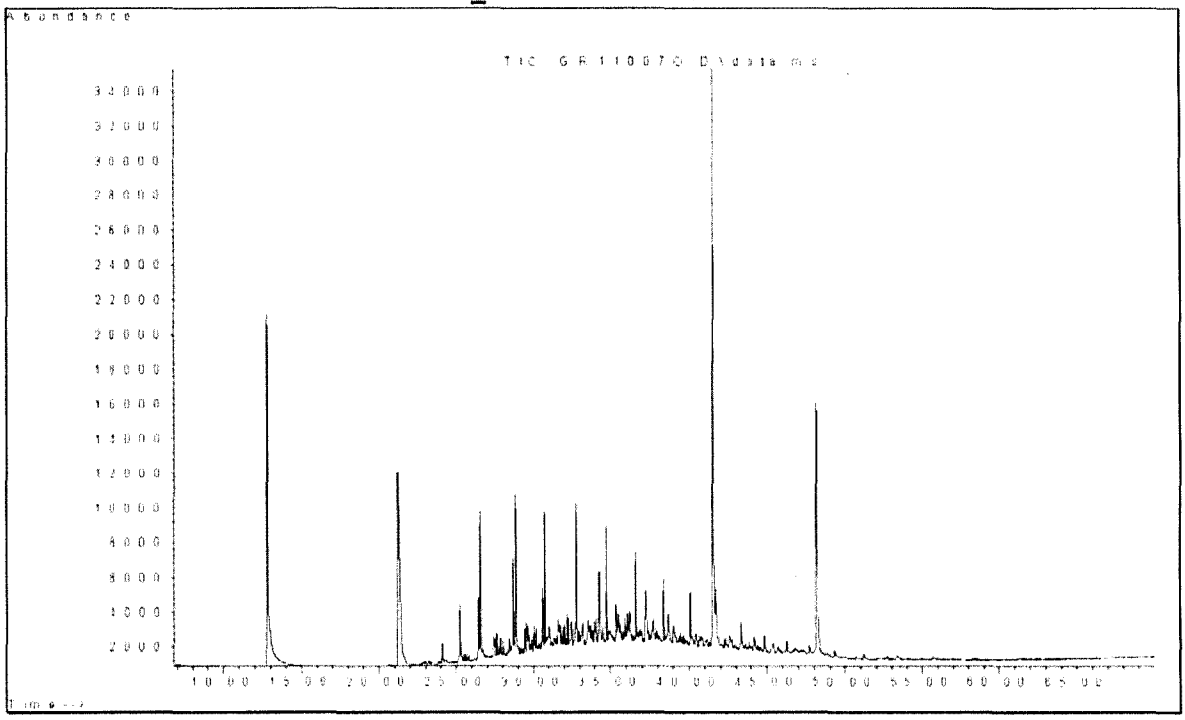
OSE II_ Time=0 week – Alkanes



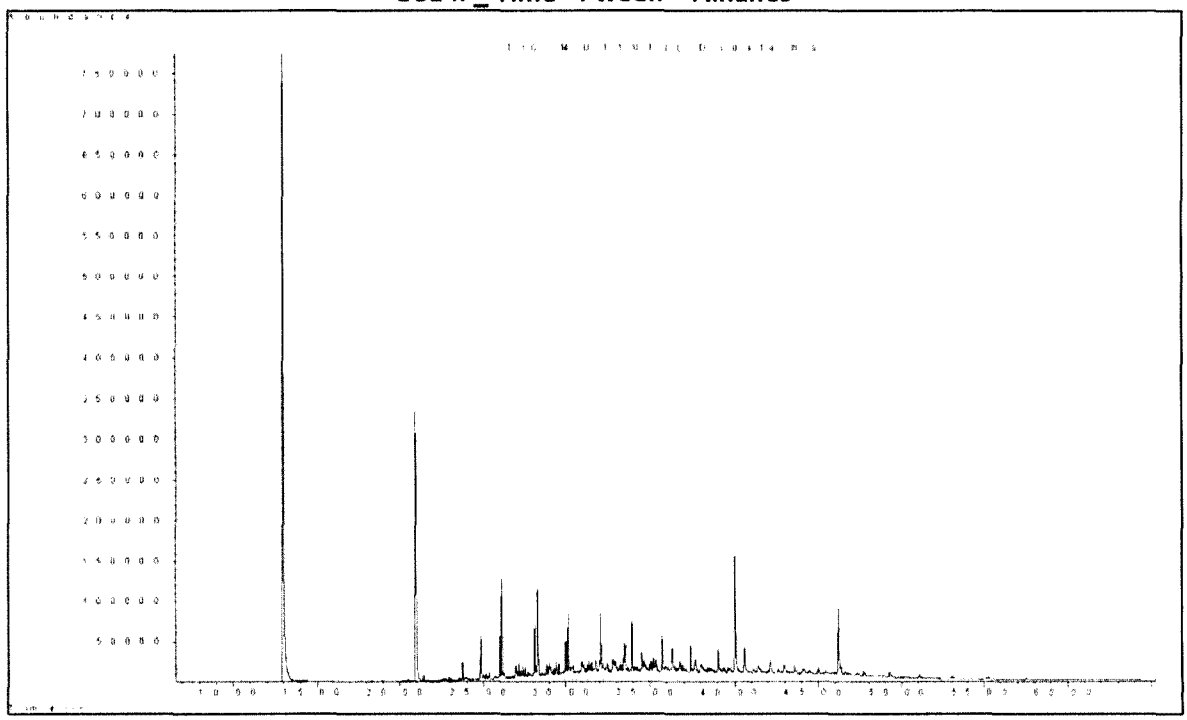
OSE II _ Time=1 week – Alkanes



OSE II _ Time=2 week – Alkanes



OSE II _ Time=4 week – Alkanes



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OSEI Corporation Summary

US Department of Interior Study on the Characteristics, Behavior, & Response Effectiveness of Spilled Dielectic Insulating Oil in the Marine Environment

The US department of Interior, through solicitation number M08PS00094, award number: M09PC002, through their Bureau of Ocean Energy Management and Enforcement (BOEMRE), (previously Mineral Management Service) paid for a study of dielectric oil's ability to be dispersed, skimmed and bio remediated.

Information specifically related to the product called OSE II begins on page 12. It states:

"Bioremediation Study

This bioremediation effectiveness testing protocol (CFR, 1999) was designed to determine oil's ability to naturally biodegrade by quantifying changes in the oil composition resulting from biodegradation.

An EPA National Contingency Plan (NCP) approved product, Oil Spill Eater II (Oil Spill Eater International, Corp.), was include in the experimental design.

Bioremediation testing on Oil Spill Eater II (OSE II) has proven it to be effective at degrading highly-saturated crude oils in the laboratory. The following test flasks (labeled with unique identifiers) were prepared and set up on an orbital shaker at day 0 to reflect the following treatment:

Table 3. Bioremediation Study Sampling and Analysis Matrix

Treatment No. of samples at sampling times Total No. of analytical determinations
Day 0 Day 7 Day 28 Microbial Counts GC/MS Gravimetric
Control 3 3 3 9 9 9
Nutrient 3 3 3 9 9 9
Product* 3 3 3 9 9 9
Control = Oil + Seawater
Nutrient = Oil + Seawater + Nutrients
Product = Oil + Seawater + Nutrients + Product

*A NCP approved product, OSE II
A detailed description of the test procedure can be found in the Code of Federal Register Title 40, Chapter 1 Part 300".

Despite some problems in the way the study was carried out, he study shows OSE II is very effective at remediating the dieletric oil. For some reason unneeded nutrients were added in to the process, contrary to the manufacturer's directions for application. These unnecessary, added nutrients increased the toxicity of the test flasks, which in turn slowed down the degradation rate of the oil and limiting the true results to be expected based on numerous other test in which the protocols laid out by the manufacturer were more closely followed. Nonetheless, the study still showed OSE II to be absolutely effective at rapidly degrading the dieletric oil.

Also contrary to the manufacturer's instructions, the administrators of the test also added non-indigenous bacteria after the test was started. This also caused a slow down in degradation and prevented OSE II from showing the expected 100% degradation rate of the dielectric oil in 28 days. By introducing non-indigenous bacteria into the application after the test process was started, a competition between the OSE II-enhanced natural indigenous bacteria, and the foreign, non indigenous bacteria was created. While these bacteria are competing, they are killing each other off in the fight for the food source: the oil. This lessened the amount of oil remediated at the end of the experiment, since some of the indigenous microbes' time is spent fighting other bacteria for the food source rather than just being able to focus on digesting the oil to CO2 and water.

The test, however, proved, once again, how effective OSE II is at remediating oil - even dielectric oil. The results showed over a 67% reduction in the oil in 28 days. The reduction was exponential if you account for the slowdown due to the added bacteria, (see the difference in remediation from day 0 to day 7, and from day 7 to day 28). So even with the adversities the product had to overcome which were caused by the test administrators, it is easy to understand that OSE II would have only needed a few days more for 100% bio remediation of the oil to occur, resulting in a complete conversion of the oil to CO2 and water.

This study also tested dispersants and mechanical skimming of the oil as well. The dispersants, Exxon's Corexit 9500 and 9527A, respectively showed poor results as the water temperature decreased. It is important to note that dispersants do not clean up oil; they disperse oil broadly into the water column. This spreads the toxic impact of the oil into the area of the water where 60% of the marine species live, adversely effecting these species' ability to survive.

The Deepwater Horizon Gulf of Mexico spill also proved that both Corexits eventually sink oil to the seabed, increasing the spill's impact to an additional area, killing these species and destroying their habitats. Then the Gulf spill proved that the sunken/dispersed oil then migrates to the shoreline, impacting yet another area, where the same oil has to be addressed a second time. The use of these toxic

dispersants causes absolutely needless destruction of natural resources and species. Both Corexits were also found to be very toxic and deleterious by themselves to marine and wildlife species as well as to seabed, water column and shoreline flora and fauna. A recent study by Woods Hole Oceanographic Institute also discovered that both Corexits prevent oil from degrading, which means these dispersants are going to increase the length of time that the oil's toxicity effects the environment.

This Department of Interior study was performed due to the fact that a spill could impact the Nantucket Sound, Cape Cod, and Martha's Vinyard area in the US. The EPA/RRT, federal, state, local governments, and residents now have a choice between 1) mechanical skimming, that will only remove somewhere between 2 to 8% of the oil; 2) dispersants that increase rather than decrease the oil's toxicity and spread it to several additional areas, killing species, and destroying natural resources, only to have to address the same oil once again, once it comes ashore; or 3) OSE II, the product who's successful testing since 1989, and once again with this study, shows OSE II dramatically limits the impact of the spill, does not harm species, and converts 100% of the oil to CO2 and water, eliminating any additional steps, while protecting the environment. OSE II is far more economical than mechanical skimming, adsorbents, or dispersants. OSE II is far less expensive, safer, and more effective at rapidly cleaning up 100% of a spill.

This test, along with the large number of tests already carried out on OSE II since 1989, proves, once again, OSE II is very effective at remediating oil and converting oil to CO2 and water. This Department of Interior test, through BOEMRE, now proves there is only one way to effectively clean up 100% of a spill, preventing secondary impacts of the spill, and remediating the entire spill to safe, non-toxic CO2 and water. Of the eight bio remediation products tested at LSU by the US EPA and BP, OSE II was the only product which effectively remediated the most toxic part of the oil – the PAHs without any additions. The Department of Interior chose only one bio remediation product from that group of eight to do further tests on. That product was OSE II, thus, proving that OSE II was the best product tested for the Deepwater Horizon oil blowout.

The Department of Interior now has a product that they can add to a drilling rigs for emergency response, to safely and effectively convert oil to CO2 and water, OSE II is the non toxic alternative with a tested substantiated end point.